1880-

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THE

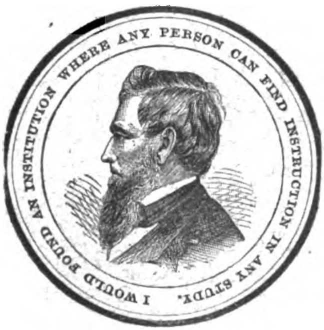
CORNELL

University Register

AND CATALOGUE

1879-80

THIRD EDITION



Ithaca

PUBLISHED BY THE UNIVERSITY

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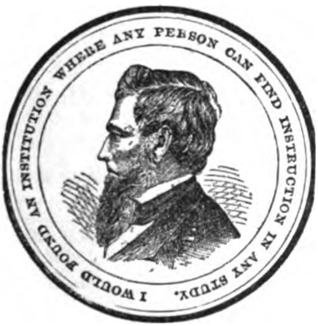

ITHACA
PUBLISHED BY THE UNIVERSITY
1880

CONTENTS.

MEANS AND FACILITIES FOR EDUCATION.

THE CALENDAR.

1879	**Sept. 16**	**Fall Term.**
September 16	Tuesday	Entrance Examinations.
September 17	Wednesday	Entrance Examinations continued.
September 18	Thursday	REGISTRATION for the Term.
September 19	Friday	Instruction begins.
November	Thursday and Friday	THANKSGIVING.
December 15	Monday	Term Examinations begin.
December 19	Friday	Term ends.
1880	**Jan. 6**	**Winter Term.**
January 6	Tuesday	Entrance Examinations.
January 7	Wednesday	Entrance Examinations continued.
January 8	Thursday	REGISTRATION for the Term.
January 9	Friday	Instruction begins.
January 11	Sunday	FOUNDER'S DAY.
February 22	Sunday	WASHINGTON'S BIRTHDAY.
March 5	Friday	Woodford Prize Competition.
March 22	Monday	Term Examinations begin.
March 26	Friday	Term ends.

1880	April 3		Spring Term.
April	3	Saturday	REGISTRATION for the Term.
April	5	Monday	Instruction begins.
May	17	Monday	Commencement Essays handed in.
May	30	Sunday	DECORATION DAY.
May	31	Monday	Senior Examinations begin.
June	1	Tuesday	Examinations for Second Degrees.
June	7	Monday	Term Examinations begin.
June	12	Saturday	Term Examinations end.
June	14	Monday	Entrance Examinations begin at the University.
June	15	Tuesday	Entrance Examinations begin at Chicago, Cleveland and Boston.
June	15	Tuesday	Class Day.
June	16	Wednesday	Alumni Day. Annual Meeting of the Trustees.
June	17	Thursday	ANNUAL COMMENCEMENT.
1880	Sept. 14		Fall Term.
September	14	Tuesday	Entrance Examinatons.
September	15	Wednesday	Entrance Examinations continued.
September	16	Thursday	REGISTRATION for the Term.
September	17	Friday	Instruction begins.

OFFICERS OF THE UNIVERSITY.

BOARD OF TRUSTEES.

Annual Meeting of the Board on the Wednesday before Commencement at 10 a. m.

OFFICERS OF THE BOARD:

HENRY W. SAGE,	- - - - - -	*Chairman.*
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Secretary of the Faculty.

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Professor of Physiology, Comparative Anatomy and Zoology.

GOLDWIN SMITH, LL.D., L.H.D., Toronto, Canada.
Lecturer on English and Constitutional History.

JAMES LAW, F.R.V.C., University Hill.
Professor of Veterinary Medicine and Surgery.

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Professor of Botany, Horticulture and Arboriculture.

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SIBLEY *Professor of Mechanical Engineering and Machine Construction.*

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Professor of Spanish and Italian and Assistant Professor of French.

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Assistant Professor of Mathematics.

CHARLES A. SCHAEFFER, M.A., PH.D., 103 E. Seneca.
Professor of General and Analytical Chemistry, and of Mineralogy.

FREDERICK L. O. RŒHRIG, PH.D., M.D., 231 E. State St.
Professor of Sanscrit and Living Asiatic Languages, and Assistant Professor of French.

HIRAM CORSON, M.A., LL.D., 58 Cascadilla.
Professor of Anglo-Saxon and English Literature.

WATERMAN T. HEWETT, M.A., PH.D., Cascadilla Cottage.
Assistant Professor of German.

BELA P. MACKOON, M.A., University Avenue.
Professor of German.

CHARLES H. WING, B.S., Jamaica Plain, Mass.
Non-Resident Professor of Organic Chemistry.

ALFRED STEBBINS. M.A., 110 N. Aurora St.
Assistant Professor of South European Languages.

LUCIEN A. WAIT, B.A., University Hill.
Associate Professor of Mathematics.

TRACY PECK, M.A., 63 Eddy St.
Professor of the Latin Language and Literature.

ISAAC FLAGG, PH.D., 28 Mitchell St.
Professor of the Greek Language and Literature.

CHARLES CHAUNCEY SHACKFORD, M.A., University Avenue.
Professor of Rhetoric and General Literature.

REV. CHARLES BABCOCK, M.A., University Grounds.
Professor of Architecture.

JAMES EDWARD OLIVER, M.A., 69 Heustis St.
Professor of Mathematics.

WILLIAM A. ANTHONY, PH.B., 130 E. Buffalo St.
Professor of Physics and Experimental Mechanics.

HJALMAR HJORTH BOYESEN, PH.D., University Avenue.
Professor of German Literature and Assistant Professor of North European Languages.

ESTEVAN A. FUERTES, PH.B., C.E., 170 E. State St.
Professor of Civil Engineering.

EDWIN C. CLEAVES, B.S., Cortland.
Assistant Professor of Free-hand Drawing and of Mechanical Draughting.

ISAAC P. ROBERTS, M.AGR., University Farm.
Professor of Agriculture.

ABRAM A. BRENEMAN, B.S., 116 Cascadilla.
Professor of Industrial Chemistry and Assistant Professor of Analytical Chemistry.

CHARLES LEE CRANDALL, C.E., West Hill.
Assistant Professor of Engineering.

IRVING P. CHURCH, C.E., 105 Cascadilla.
Assistant Professor of Engineering.

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Assistant Professor of German Language and Literature.

J. HENRY COMSTOCK, B.S., [In Washington.]
Assistant Professor of Entomology, and Lecturer on the Zoology of Invertebrates.

WILLIAM R. DUDLEY, M.S., 108 Cascadilla.
Assistant Professor of Botany.

JAMES B. BURBANK, Brevet Major 3d Artillery, U.S.A., 135 E. Seneca St.
Professor of Military Science and Tactics.

GEORGE WILLIAM JONES, A.M., 175 E. State St.
Assistant Professor of Mathematics.

SAMUEL G. WILLIAMS, A.M., Ph.D., [In Europe.]
Professor of General and Economic Geology.

WILLIAM S. BARNARD, PH.D., 148 E. Buffalo St.
Assistant Professor of Entomology, and Lecturer on the Zoology of Invertebrates.

EDMUND LE B. GARDINER, B.M.E., 142 E. Seneca St.
Assistant Professor of Mechanical Engineering and Machine Construction.

HENRY S. WILLIAMS, PH.D., 32 W. Green St.
Assistant Professor of Geology.

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Assistant Professor of Horticulture.

SAMUEL W. POWEL, C.E., 100 Cascadilla.
Professor of Practical Mechanics and Director of the Machine Shop.

WILLIAM R. PERKINS, A.B., 23 Quarry
Assistant Professor of Latin and Greek.

OTHER UNIVERSITY OFFICERS.

WESLEY NEWCOMB, M.D.,
Curator of the Newcomb Collection of Shells.

SIMON H. GAGE, B.S.,
Instructor in Microscopy and Practical Physiology.

MADISON M. GARVER, B.S.,
Instructor in Chemistry and Mineralogy.

EDWARD GREEN, ARCH.B.,
Instructor in Architectural Draughting.

WALTER H. KENT, B.S.,
Instructor in Chemistry.

WALTER C. KERR, B.M.E.,
Instructor in Mechanic Arts.

WILLIAM E. LUCAS, PH.B.,
Instructor in Composition and Elocution.

GEORGE S. MOLER, B.M.E.,
Instructor in Physics.

NEWTON P. SCUDDER, A.B.,
Instructor in Geology and Palæontology.

B. HERMON SMITH,
Director of the University Press and Instructor in Typography.

GEORGE W. HARRIS, PH.B.,
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A. F. MATTHEWS,
Master of the Chimes.

GEORGE F. OTIS,
Janitor.

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CATALOGUE OF STUDENTS.

RESIDENT GRADUATES.

BAKER, E., B.S.	Cornell
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GIBSON, S. J., B.S.	Cornell
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HICKS, MARGARET, A.B.,	Cornell
Architecture.	
KEITH, W., B.S.	Cornell
Chemistry.	
OLNEY, WILLARD, B.C.E.,	Cornell
Chemistry and Physics.	
PALMER, LELIA B., B.S.,	Cornell
Chemistry and Physics.	
PARKE, R. A., B.M.E.	Cornell
Engineering.	
PRESTON, MAY, B.S.	Hillsdale College
History and Literature.	
SAUNDERS, C. F., B.Arch.	Cornell
History and Political Science.	

UNDERGRADUATES.

IN SENIOR STUDIES.

Allison, Charles Rollo,	Oswego,	*Science and Letters*
Atwood, Charles Edwin,	Ithaca,	*Science and Letters*
Baker, William Apollos,	Yaphank,	*Science and Letters*
Beckwith, John Dorr,	Cedarville,	*Science and Letters*
Bird, William Noble Davis,	Ithaca,	*Agriculture, Opt.*
Bissell, Esse Clarissa,	South Bend, Ind.,	*Science and Letters*

Bliss, Henry Dwight,	Holley,	*Agriculture*
Boyer, Arthur Grindage,	Aurora,	*Natural History, Opt.*
Breed, William Bradly,	Phœnix,	*Science*
Bronk, William,	New Baltimore,	*Arts*
Buck, Helen Albertine,	Watkins,	*Science and Letters*
Carpenter, Charles Raymond,	Leavenworth, Kan.,	*Natural History*
Carpenter, George,	Utica,	*Natural History, Opt.*
Carrier, William Harvey,	Phœnix,	*Science*
Clements, Gabrielle Devaux,	Philadelphia, Pa.,	*Science and Letters*
Cramphin, Harry Alexander,	Morrisville,	*Science and Letters*
Curtis, Frank Smith,	Moravia,	*Science and Letters*
Curtiss, Edward Whitehead,	Whitewater, Wis.,	*Mechanic Arts*
Ewing, Addison Luther,	La Grange, Wis.,	*Science and Letters*
Ferris, George Ferris,	Philadelphia, Pa.,	*Engineering*
Finch, William Albert,	Ithaca,	*Arts*
Fishel, Frederic Eugene,	Patchogue,	*Literature*
Gardner, William,	Syracuse,	*Science and Letters*
Gifford, George Francis,	Jamestown,	*Science and Letters*
Goodwin, DeWitt,	Dresserville,	*Science and Letters*
Green, Robert Packer,	Media, Pa.,	*Engineering*
Hamilton, Justus Albert,	Ottumwa, Ia.,	*Science*
Havens, Rodman Wesley,	Ellenburgh,	*Engineering*
Hayes, Rutherford Platt,	Fremont, O.,	*Science and Letters*
Henry, William Arnon,	Defiance, O.,	*Agriculture*
Humphrey, Charles,	Ithaca,	*Science and Letters*
Huntley, Willis Arnold,	Troy,	*Literature*
Irvine, Frank,	Sharon, Pa.,	*Science and Letters*
Johnson, Charles Haldam,	Mount Clair, N. J.,	*Arts*
Jonas, Albert,	Buffalo,	*Mathematics*
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Kelley, William Datus,	Kelley's Island, O.,	*Engineering*
Landon, Eugene Ashbel,	Vineland, N. J.,	*Engineering*
Lawrence, Frederick Cross,	Minneapolis, Minn.,	*Science & Letters*
Lawrence, James Suydam,	Seneca Falls,	*Optional*

Leary, James Thomas,	Ithaca,	*Science and Letters*
Leeds, Charles Starr,	Richmond, Ind.,	*Science and Letters*
Lovelace, Frederic Lauren,	Dundee,	*Philosophy*
Manierre, Charles Edward,	Chicago, Ill.,	*Natural History*
Mann, Gustav Marcus,	Milwaukee, Wis.,	*Agriculture*
Merry, Addison Delavan,	Phœnix,	*Science and Letters*
Mesick, David Wilson,	Kinderhook,	*Mechanic Arts*
Messenger, Hiram John,	Cortland,	*Literature*
Norton, James Eddy,	Belmont,	*Science and Letters*
Norton, Henry Mark,	New York City,	*Agriculture*
Ormsby, Frank Worden,	Oswego,	*Engineering*
Otis, George Franklin,	Boston Mass.,	*Mechanic Arts*
Page, John,	Stafford,	*Engineering*
Phelps, Susanna Stuart,	Morrisville,	*Philosophy*
Pierce, Charles Edwin,	Buffalo,	*Science and Letters*
Pierce, Henry,	Pawling,	*Engineering*
Poole, Murray Edward,	Smithboro,	*Arts*
Roberts, Mary Elizabeth,	Ithaca,	*Philosophy*
Rose, Alice Evelyn,	Cleveland, O.,	*Science and Letters*
Rudd, Willis Nathaniel,	Ithaca,	*Science*
Russel, Willliam Channing, Jr.,	Ithaca,	*Arts*
Scott, Frank Jeremiah,	Jordon, Minn.,	*Mechanic Arts*
Shackford, Lucy Bartlett,	Ithaca,	*Literature*
Sheldon, Charles Stiles,	Oswego,	*Natural History*
Sibley, Edwin Henry,	Franklin, Pa.,	*Arts*
Slauson, Allan Bedient,	Weedsport,	*Science and Letters*
Smith, Cornelia Delap,	Cambridge, Mass.,	*Arts*
Smith, Frederick William,	Ithaca,	*Arts*
Smith, Robina Silsbee,	Cambridge, Mass.,	*Arts*
Soule, Henry Howard,	Syracuse,	*Optional*
Stanton, Robert Livingston,	Tenafly, N. J.,	*Science and Letters*
Starr, Western,	Moline Ill.,	*Arts*
Terry, Edmund Burke,	Waterville,	*Science and Letters*
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Whiton, Frederic Jeffrey,	Ithaca,	*Arts*
Wilson, James Meredith,	Riverton, Ill.,	*Philosophy*
Wing, Albert John,	Albany,	*Science and Letters*

IN JUNIOR STUDIES.

Ainslie, James Stewert,	Hartwick,	*Arts*
Allen, John Granger,	Aurora,	*Mechanic Arts*
Alling, Robert Bertine,	Bangall,	*Science and Letters*
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Benedict, Thomas, Jr.,	Pittston, Pa.,	*Engineering*
Booth, Quentin Woodbury,	Rochester,	*Mechanic Arts*
Bowman, Seward Lincoln,	New Lisbon, O.,	*Science and Letters*
Brown, William Clinton,	Sandusky, O.,	*Mechanic Arts*

Bucklin, John Charles.	Oberlin, O.,	*Arts, Optional*
Bullis, Abram Rogers,	Macedon,	*Mathematics*
Burr, George Lincoln,	Newark Valley,	*Arts*
Campbell, Edwin,	Mumford,	*Science and Letters*
Carey, Frank,	Fond du Lac, Wis.,	*Nat. History*
Carman, Frederick Douglass,	Jacksonville,	*Arts*
Carolan, Frank,	San Francisco, Cal.,	*Optional*
Cartwright, Robert, Henry,	Rochester,	*Optional*
Catchpole, Edwin Watson,	Rose,	*Agriculture*
Chapman, Edwin Lyon,	Monroe, Mich.,	*Science and Letters*
Cheney, Miles Eugene,	Bemus' Point,	*Philosophy*
Chittenden, Frank Hurlbut,	Brooklyn,	*Natural History*
Clarke, Percy Edwards,	Washington, D. C.,	*Science and Letters*
Collmann, John Saunders,	Freeford Falls, Ill.,	*Science and Letters*
Concklin, Henry Sisson,	Poughkeepsie,	*Arts*
Copp, Fred Malin,	Jordan,	*Science and Letters*
Cornell, George,	Central Valley,	*Science and Letters*
Curtice, Fred Cooper,	West Winsted, Ct.,	*Natural History*
Day, Harriet McHarg,	Cooperstown,	*Arts*
Dominick, DeWitt Clinton,	Gallupville,	*Science and Letters*
Downing, Elizabeth,	Ithaca,	*Science and Letters*
Ehrlicher, Frederick Matthias,	Watertown,	*Literature*
Eidlitz, Otto Marc,	New York City,	*Engineering*
Fifield, Annie Laurie,	Worcester, Mass.,	*Literature*
Flanigan, Walter Jerome,	Binghamton,	*Arts*
Fort, Phebe Irene,	Albany,	*Science and Letters*
Goddard, Alice,	Worcester, Mass.,	*Arts*
Gregory, Emily Lovira,	Buffalo,	*Literature*
Griffith, William Ross,	Brooklyn,	*Optional*
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Hahn, Albert George Charles,	Brooklyn,	*Agriculture*
Halsey, David Rogers,	Bridgehampton,	*Arts*
Harding, Frank,	Callicoon,	*Science and Letters*
Harkness, George Sumner,	Stockton, Cal.,	*Arts, Optional*

Harlow, Gertrude Burt,	Syracuse,	*Arts*
Hawkins, Carlton Richmond,	East Hamburg,	*Engineering*
Herrick, William Porter,	East Randolph,	*Philosophy*
Heyl, Harriet,	Dunkirk,	*Literature*
Hoag, William Isaac,	Aurora,	*Natural History*
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Hunter, Nathaniel Perry,	Jasper,	*Arts*
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Mesick, Frederic Peter,	Kinderhook,	*Engineering*
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Moses, Willis Holley,	Malone,	*Science and Letters*
Moulton, Guy,	Cicero,	*Science and Letters*
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Ostrander, Will Sterling,	Schuylerville,	*Science and Letters*
Otis, Hanna Wood,	Sherwood,	*Science and Letters*
Palmer, Milton Cornelius,	Sing Sing,	*Science and Letters*
Parmelee, Robert Murray,	Cleveland, O.,	*Science and Letters*
Place, Ira Adelbert,	Alfred Centre,	*Arts*
Read, Jesse Edwin,	Greenpoint,	*Engineering*
Redington, Horace Greeley,	Amherst, O.,	*Arts, Optional*

Rich, Fred William,	West Potsdam,	*Science*
Rites, Francis Marion,	Chester,	*Mechanic Arts*
Roberts, David Evan,	Constableville,	*Hist. & Pol. Science*
Roehrig, Fred Lewis,	Ithaca,	*Architecture*
Ryman, Frederick Sweasy,	Dallas, Pa.,	*Optional*
Saunders, Charles Lockard,	Omaha, Neb.,	*Hist. & Polit. Science*
Schumm, George,	San Francisco, Cal.,	*Optional*
Shinkel, John Newton Dexter,	Rochelle, Ill.,	*Science and Letters*
Shiras, George,	Pittsburgh, Pa.,	*Science and Letters*
Shnable, Emile Ralph,	Chicago, Ill.,	*Engineering*
Simmons, Parke Edmund,	Clarence, Ia.,	*Hist. & Pol. Science*
Skinner, James Henry,	Faribault, Minn.,	*Science and Letters*
Smith, Raymond Lee,	Ithaca,	*Science and Letters*
Smith, Theobald,	Albany,	*Philosophy*
Sommers, Harry Cantine,	Ithaca,	*Arts*
Spencer, Stella Diantha,	Unadilla,	*Philosophy*
Stambaugh, Henry Hamilton,	Youngstown, O.,	*Science and Letters*
Stearns, James Brainard,	Rouse's Point,	*Arts*
Storey, William,	Rochester,	*Engineering*
Studley, Duane,	South Byron,	*Science*
Taylor, Oscar Livingstone,	Freeport, Ill.,	*Science and Letters*
Teague, Clara Louisa,	Caribou, Me.,	*Science and Letters*
Thompson, Erwin William,	Smithville, Ga.,	*Mechanic Arts*
Trainer, John Walter,	Steubenville, O.,	*Optional*
Upton, Charles Olmsted,	Clymer,	*Agriculture*
Van Pelt, Gertrude Wyckoff,	Trumansburg,	*Science and Letters*
Vaughan, Edward Gilpin,	Richmond, Ind.,	*Science and Letters*
Waterbury, Henry Talmadge,	Rensselaerville,	*Mechanic Arts*
Watson, George Catchpole,	Clyde,	*Agriculture*
Wendell, Henry Ten Eyck,	Chicago,	*Architecture*
Wick, Richard Brown,	Pittsburgh, Pa.,	*Engineering*
Wightman, Willard Humphrey,	Hastings,	*Engineering*
Wilson, Frank Thomas,	Corry, Pa.,	*Science and Letters*
Wilson, Josiah Dustin,	N. Haverhill, N. H.,	*Optional*

Winegar, Harry Philips,	San Francisco, Cal.,	*Arts, Opt.*
Wing, Henry Hiram,	Willow Brook,	*Agriculture*
Withington, Alfreda Bosworth,	South Amboy,	*Arts*

IN SOPHOMORE STUDIES.

Adams, John Davis,	Plainville,	*Literature*
Ayeres, Mary Frances,	Ithaca,	*Literature*
Baker, Clarence Albert,	Yaphank,	*Medical Preparatory*
Baker, Leslie Arthur,	Olean,	*Agriculture*
Ballard, Eugene Forrest,	Black Hawk, Col.,	*Hist. & Polit. Sc.*
Beebe, George,	Penn Yan,	*Science and Letters*
Biscoe, Helen Maria,	Keene, N. H.,	*Hist. & Pol. Science*
Blackstein, Arthur,	New York City,	*Med. Preparatory*
Boss, Charles Edgar,	Smyrna,	*Optional*
Bowen, Anna Cornelia,	Batavia,	*Arts*
Brown, Ellen Coit,	Ithaca,	*Science and Letters*
Brown, Frederick Lord,	Sag Harbor,	*Architecture*
Brunn, Armin Earnest,	New York City,	*Agriculture*
Buckland, Benjamin Isaac Coman,	Port Byron,	*Med. Preparatory*
Carlson, Eleanore Frederica,	Owego,	*Literature*
Carmody, Thomas,	Bellona,	*Science and Letters*
Carpenter, Calvin,	Troy,	*Science and Letters*
Carson, William,	St. Paul, Minn.,	*Science and Letters*
Casey, Patrick Joseph,	Binghamton,	*Arts*
Catlin, Frederick Miles,	Erie, Pa.,	*Arts*
Chandler, Frances Harden,	Ithaca,	*Optional*
Chester, Frederic Dixon,	St. Louis, Mo.,	*Science and Letters*
Coe, Alfred Byron,	Oswego,	*Science and Letters*
Cole, Chester Glen,	Corning,	*Literature*
Cole, Emma Jane,	Lowell, Mich.,	*Optional*
Cornell, Elizabeth Percival,	Willow Creek,	*Optional*

Cowell, Alexander Tyng,	Erie, Pa.,	*Literature*
Cowles, Albert Hutchingson,	Cleveland, O.,	*Optional*
Crider, Rollin Frederick,	Greenville, O.,	*Optional*
Curtis, Ida Maynard,	Boston, Mass.,	*Science and Letters*
Cushing, Harry Platt,	Cleveland, O.,	*Philosophy*
Desbecker, Daniel,	Buffalo,	*Optional*
Dibble, Henry Montgomery,	Marshall, Mich.,	*Literature*
Ely, Prescott,	Marquette, Mich.,	*Hist. and Pol. Sc.*
Fairchild, Tracy Rasselas,	Ovid,	*Engineering*
Fay, Lewis George,	Burlington,	*Arts*
Ferguson, Oakley Walter,	Troy,	*Engineering*
Fiske, Ferdinand Comstock,	Maquoketa, Ia.,	*Architecture*
Foucar, Edward Louis,	Boston, Mass.,	*Optional*
Fowler, Mary,	Governeur,	*Science and Letters*
Gardiner, William Frederick,	Fort Covington,	*Medical Preparatory*
Gill, Francis Beaman,	Antwerp,	*Science and Letters*
Grant, Edith,	New York City,	*Philosophy*
Gritman, William Ball,	Carbondale, Pa.,	*Hist. & Pol. Science*
Hamill, Vincent Gilbert,	Phœnix,	*Medical Preparatory*
Harding, William Elias,	Bethany,	*Agriculture*
Hatch, Arthur Gillespie,	Perry,	*Philosophy*
Heermans, Thaddeus Willson,	Chicago, Ill.,	*Mechanic Arts*
Heron, Nannie Jacobs,	Danville, Ky.,	*Arts*
Hine, Charles Leman,	Washington, D. C.,	*Hist. & Pol. Sc.*
Hiscock, Albert King,	Syracuse,	*Arts*
Holman, Julian,	Bolton, Mass.,	*Agriculture*
Horr, Norton Townshend,	Wellington, O.,	*Science and Letters*
Horr, Rollin Cortland,	Wellington, O.,	*Science and Letters*
Hutchinson, Douglas Welton,	Chicago, Ill.,	*Science and Letters*
Jones, George Augustus,	Addison, Ia.,	*Agriculture*
Jones, Hervey Brayton,	Westernville,	*Optional*
Kenney, Eudorus Catline,	Truxton,	*Mathematics*
Kent, William Archie,	Oil City, Pa.,	*Science and Letters*
Krüsi, Hermann,	Oswego,	*Engineering*

Leary, Frank,	Ithaca,	*Science and Letters*
Lemann, Charles Henry,	Bathampton, Eng.,	*Agriculture, Special*
Luckey, Frank Ranney,	Poughkeepsie,	*Science and Letters*
Lukes, Currie Wilson,	Racine, Wis.,	*Hist. and Polit. Science*
Lyon, John,	Schuylerville,	*Hist. and Polit. Science*
McClelland, Robert Watson,	Pittsburgh, Pa.,	*Philosophy, Opt.*
McDermid, Andrew Jackson,	Marshall, Mich.,	*Agriculture*
Mott, Seward,	Bouckville,	*Natural History*
Oatley, Eugene Lyman,	Utica,	*Medical Preparatory*
Pierce, Daniel Addison,	Baldwinsville,	*Philosophy*
Pitcher, Charles Daniel,	Owego,	*Arts*
Potter, Bina Abigal,	Ithaca,	*Optional*
Pratt, Ransom,	Corning,	*Science and Letters*
Purdy, Markwell Seward,	Corning,	*Arts*
Putnam, Mary Chastina,	Ellington,	*Literature*
Rackemann, Felix,	Lenox, Mass.,	*Science and Letters*
Rappleye, Walter Glazier,	Minetto,	*Science and Letters*
Reading, William Barton,	West Falls,	*Hist. and Polit. Science*
Reed, Jared Ackerson,	Ontario,	*Science and Letters*
Robie, Harry Adams,	Marathon,	*Mechanic Arts*
Roberts, Willis Markel,	Seneca Falls,	*Mechanic Arts*
Root, Daniel Bayard,	Port Byron,	*Arts, Opt.*
Rosen, George,	Louisville, Ky.,	*Agriculture*
Ruger, Crawford Proser,	Syracuse,	*Arts, Opt.*
Sazé, Hidesabro,	Fukushima, Japan,	*Agriculture*
Schenck, Herbert Dana,	Union Springs,	*Natural History*
Sears, Stephen Parrish,	Buffalo,	*Literature*
Sheldon, Frances Elizabeth,	Oswego,	*Optional*
Shiras, Winfield Kennedy,	Pittsburg, Pa.,	*Science and Letters*
Shorter, Thomas Jaye,	Aurora,	*Optional*
Sibley, Lucy Culver,	Cuba,	*Science and Letters*
Smith, Henry Willis,	Woodbourne,	*Optional*
Smith, Hermon Woodworth,	Trumansburg,	*Science and Letters*
Smith, Isaac Parshall,	Ithaca,	*Arts*

Smith, Joseph Lesley,	Canajoharie,	*Science and Letters*
Sommers, Frederick Skelding,	Ithaca,	*Optional*
Soper, Grace Weld,	Waltham, Mass.,	*Arts*
Stevens, Charles Henry,	Homer,	*Arts, Opt.*
Streeter, Howard Malcolm,	Tunkhannock, Pa.,	*Arts*
Suydam, Frederick,	Baldwinsville,	*Mechanic Arts*
Thompson, James Calvin,	Pittsburgh, Pa.,	*Medical Preparatory*
Thompson, Madeline Sylvester,	Passaic, N. J.,	*Science and Letters*
Trumbull, William,	Sandy Hill,	*Engineering*
Tucker, John Thomas,	Varna,	*Agriculture*
Tupper, Leonidas Harvey,	Decatur, Ill.,	*Optional*
Tuthill, James Fred,	Corning,	*Philosophy*
Van Pelt, Elizabeth Vredenburg,	Trumansburg,	*Science and Letters*
Van Rensselaer, John,	Ithaca,	*Arts*
Wait, John Cassan,	Norwich,	*Engineering*
Waldo, Gerald,	Scotland, Ct.,	*Agriculture*
Wallenbeck, George,	Watkins,	*Natural History, Special*
Webster, John Guerdon,	Bath,	*Natural History*
Wilcox, Asa Stearns,	East Minneapolis, Minn.,	*Optional*
Wilkinson, Marion,	Syracuse,	*Arts*
Williams, Isaac,	Niagara, Canada,	*Agriculture*
Wilson, Dora Frank	Ithaca,	*Science and Letters*
Woodard, James Allen,	Elma,	*Science and Letters*
Woodruff, Edwin Hamlin,	Ithaca,	*Science and Letters*
Wright, George Herdman	Buffalo,	*Arts*
Yeaw, Everett,	Lawrence, Mass.,	*Arts, Opt.*

IN FRESHMAN STUDIES.

Alling, Asa Alling,	Bangal,	*Science and Letters*
Anderson, Charles Henry,	Griggsville, Ill.,	*Literature*
Andrus, Elon Oscar,	Watertown,	*Science*

Avery, Charles Irving,	Auburn,	*Science and Letters*
Avery, James Carrington	Auburn,	*Science and Letters*
Ayres, Philip Wheelock,	Villa Ridge, Ill.,	*Philosophy*
Badger, Theodore,	Ithaca,	*Agriculture*
Baum, Josephine,	Syracuse,	*Science and Letters*
Bellows, Elmer Ellsworth,	Albany,	*Mechanic Arts*
Beye, John Charles,	Laurel, Ia.,	*Science*
Biggs, Herman Michael,	Trumansburg,	*Arts*
Blue, Frank,	Jacksonville,	*Arts*
Booth, Irving Edward,	Rochester,	*Mechanic Arts*
Boulton, Jessie Mary,	Oil City, Pa.,	*Science and Letters*
Boyer, Jerome Webster,	Freeport, Ill.,	*Agriculture*
Brainard, Austin,	Higganum, Ct.,	*Science and Letters*
Brownell, Hart Murray,	New York City,	*Engineering*
Bullock, George,	Cincinnati, O.,	*Mechanic Arts*
Burpee, George Herbert,	Saquoit,	*Mechanic Arts*
Cahn, Benjamin Robert,	Chicago, Ill.,	*Optional*
Cain, James Laurence,	Flushing,	*Science and Letters*
Carr, Frank Headley,	Cleveland, O.,	*Optional*
Casey, Frederic Dent,	New York City,	*Optional*
Chase, Charles Curry,	Schenevus,	*Literature*
Chittenden, Hiram Martin,	Yorkshire Centre,	*Optional*
Cobb, William Howard,	Andover,	*Agriculture*
Countryman, Charles Edwin,	Albany,	*Optional*
Crooker, Edward Henry,	Minneapolis, Minn.,	*Arts, Opt.*
Curtis, Charles Locke,	Newfield,	*Arts, Opt.*
Cushing, Edward Fitch,	Cleveland, O.,	*Philosophy*
Diefendorf, Mary Riggs,	Brooklyn,	*Arts*
Dietz, John Fanning,	Schoharie,	*Science and Letters*
Dix, John Alden,	Glen's Falls,	*Optional*
Dowling, Eunice,	Bradford,	*Arts, Opt.*
Duryea, Edwin,	Craigville,	*Engineering*
Dwellé, William Delafield,	Penn Yan,	*Arts*
Eaton, William Moser,	Ithaca,	*Philosophy,*

Ehrman, Harry,	Decatnr, Ill.,	*Science and Letters*
Elmer, Herbert Charles,	Rushford,	*Arts*
Ely, Arthur Courtland,	Diamond City, Utah,	*Sci. and Letters*
Ewing, William Bion,	Huntington, Ind.,	*Engineering*
Failing, Milton,	Rexville,	*Science and Letters*
Fairbanks, Leland,	New York City,	*Mechanic Arts*
Finch, Robert Brooks,	Ithaca,	*Science and Letters*
Fraser, James,	Johnstown,	*Science and Letters*
Freeman, Walter Jackson,	Philadelphia, Pa.,	*Nat. History*
Fuertes, James Hillhouse,	Ithaca,	*Engineering*
Gambee, Linnie,	Varick,	*Literature*
Gwynne, Edmiston,	Columbus, O.,	*Science and Letters*
Hadley, Frank Ozro,	Danville, Ind.,	*Arts, Opt.*
Handy, Ella Marie,	Schoharie,	*Optional*
Hodgman, Edward Balcom,	Painted Post,	*Engineering*
Hoffman, Harry Natt,	Elmira,	*Optional*
Holloway, Edward Norton,	Indianapolis, Ind.,	*Optional*
Holton, Frederick Arthur,	Washington, D. C.,	*Chem. & Physics*
Hosea, Joseph Chase,	Clifton, O.,	*Architecture*
Hough, Azel Clarence,	South Butler,	*Science and Letters*
Howard, William Turner,	New Orleans, La.,	*Science and Letters*
Humphries, John Henry,	Syracuse,	*Science and Letters*
Ingersoll, George Talcott,	Cleveland, O.,	*Mechanic Arts*
Jacobs, Townsend Herbert,	Ithaca,	*Architecture*
Johnson, Edward Newton,	Reading, Pa.,	*Arts*
Jones, Newton Lewis,	West Albany,	*Mechanic Arts, Opt.*
Kelly, Charles Wallace,	Albany,	*Mechanic Arts*
Kerr, Milton Royce,	Mongaup Valley,	*Science*
Levi, Louis Eleazer,	Buffalo,	*Chem. & Physics*
Lillis, Thomas Francis,	Norwich,	*Mechanic Arts*
Longwell, Harry Edgar,	Monongahela City, Pa.,	*Mechanic Arts*
Mapes, Arlington,	Rushvllle,	*Arts, Opt.*
Marshall, Holmes,	Cleveland, O.,	*Arts*
Matteson, David,	Dunkirk,	*Optional*

Matthews, Albert Franklin,	Orange, N. J.,	*Arts, Opt.*
Matthews, Peter Baldey,	Plainfield, N. J.,	*Optional*
Maxwell, Emma Eliza,	North Clymer,	*Science and Letters*
McGraw, DeWitt Hiram,	Binghamton,	*Arts*
Miller, Harvey Irving,	Richmond, Ind.,	*Engineering*
Mott, Edward Partridge,	Kingsbury,	*Optional*
Nash, Horace,	Ithaca,	*Mechanic Arts*
Odell, Albert,	Bloomville,	*Engineering*
Page, William Henry,	Stafford,	*Engineering*
Park, Charles Caldwell,	Alleghany City, Pa.,	*Agriculture*
Patterson, Roswell Henry,	Herrick Centre,	*Science and Letters*
Payne, Lewis Taber,	Tonawanda, Pa.,	*Science and Letters*
Pearson, Edward,	Sedalia, Mo.,	*Engineering*
Phelps, Henry Samuel,	Morrisville,	*Optional*
Pierce, Jerome Victor,	Buffalo,	*Literature*
Place, Edwin,	Cincinnatus,	*Engineering*
Potter, Charles Anson,	Alpine,	*Science and Letters*
Pratt, John Lovejoy,	Buskirk's Bridge,	*Science and Letters*
Prentiss, Evarts Lincoln,	Penn Yan,	*Literature*
Preswick, Eugene Henry,	Ithaca,	*Science and Letters*
Prosser, Charles Smith,	Brookfield,	*Science and Letters*
Raynor, George Cartwright,	Riverhead,	*Science and Letters*
Reed, James William,	Warrensburgh,	*Engineering*
Rhodes, Frances,	Trempealeau, Wis.,	*Architecture*
Richards, Walter Barnes,	Leavenworth, Kan.,	*Mechanic Arts*
Ruggles, William Benjamin,	Bath,	*Mechanic Arts*
Runyon, Frank Willits,	Plainfield, N. J.,	*Literature*
Russel, Frank Channing,	Ithaca,	*Arts*
Searing, Byron Hudson,	Sherwood,	*Science*
Serat, Seth Swift,	Elmira,	*Science and Letters*
Scherer, Robert George,	Albany,	*Optional*
Sheldon, Daniel Corydon,	Delphi,	*Engineering*
Smith, Delano Eugene,	New York City,	*Science and Letters*
Southwick, John Leonard,	Bombay,	*Science and Letters*

Sprout, Helen Louise,	Brooklyn,	*Science and Letters*
Stevenson, George Edward,	Clark's Green, Pa.,	*Agriculture*
Stuart, George Anson,	Skaneateles,	*Philosophy*
Sullivan, Frank Robert,	Pompey Centre,	*Philosophy*
Sweet, Vaughn Charles,	Phœnix,	*Mechanic Arts*
Thayer, George Henry,	Plymouth, Ind.,	*Philosophy*
Tinsley, Henry Greenwood,	Lyons,	*Arts, Opt.*
Tomkins, Walter,	Newark, N. J.	*Optional*
Turner, Ebenezer Tousey,	Ithaca,	*Engineering*
Vaughan, James Frye,	Springville,	*Arts, Opt.*
Welby, Arthur Adlard,	Rie de Janeiro, Brazil,	*Mechanic Arts*
Weston, Fred Abijah,	Painted Post,	*Science and Letters*
Wetherell, Jane Johnson,	Philadelphia, Pa.,	*Science and Letters*
Wheeler, Amos,	Ithaca,	*Optional*
Wheeler, William Murray,	Varna,	*Philosophy*
Whelpley, James Davenport,	Hastings on the Hudson,	*Agriculture*
Whitney, Harry Leroy,	Plymouth, Pa.,	*Science and Letters*
Wilcox, Fred Clarence,	Ithaca,	*Arts, Opt.*
Wilcox, Fred Elmer,	Ithaca,	*Agriculture*
Woodruff, Cora Eliza,	Ithaca,	*Arts*
Wyckoff, James Newton,	Perry,	*Science and Letters*
Yost, Florence Lincoln,	New York City,	*Science and Letters*

SUMMARY BY YEARS.

Graduates	9
In Senior or Fourth Year Studies	89
In Junior or Third Year Studies	118
In Sophomore or Second Year Studies	120
In Freshman or First Year Studies	127
	463

SUMMARY BY COURSES.

Courses.	Seniors.	Juniors.	Soph.	Fr.	Total.
Arts	12	20	18	19	69
Literature	5	7	8	6	26
Philosophy	4	5	6	7	22
Science and Letters	33	34	29	34	130
Science	5	3	0	4	12
Mathematics	1	1	1	0	3
Natural History	7	4	4	1	16
Agriculture	5	11	12	7	35
Architecture	2	3	2	3	10
Chemistry and Physics	0	0	0	2	2
Civil Engineering	9	12	5	13	39
Mechanic Arts	4	6	4	15	29
History and Political Science	0	3	8	0	11
Medical Preparatory	0	0	7	0	7
Optional	2	9	16	16	43
Total of Undergraduates					454
Graduates					9
Total in the University,					463

THE CORNELL UNIVERSITY.

GENERAL VIEW.

FOUNDATION.

The existence of the Cornell University is due to the combined bounty of the United States Government and of Ezra Cornell On the second of July, 1862, the United States Congress passed an act granting public lands to the several States and Territories which should provide Schools for the promotion of Agriculture and the Mechanic Arts. Under this act, thirty thousand acres for each of its Senators and Representatives in Congress were appropriated to every State, and, under this provision, the share of the State of New York was in land scrip representing nine hundred and ninety thousand acres.

In 1865 the Legislature of the State of New York transferred the entire proceeds of the land grant to the Cornell University, upon its compliance with certain conditions, of which the most important were that Ezra Cornell should give to the Institution five hundred thousand dollars, and that provision should be made for the education, free of all charge of tuition, of one student from each Assembly District of the State. At the first meeting of the Trustees thereafter, Mr. Cornell fulfilled the requirements of the Charter. He then made the additional gift of over two hundred acres of land, with buildings, to be used as a farm in connection with the Department of Agriculture, and of the Jewett collection in Geology. He has made, since that time, many other large gifts, amounting to several hundred thousand dollars.

The Charter of the University is comprised in two acts of the Legislature of New York, commonly known as "The Act of Incorporation" and "The Amended Act of Incorporation." These laws bestow upon the University the income of the sale of the public lands, granted to the State by the action of Congress for educational purposes. They provide also for the election of Trustees, and for the appointment of State students, and establish the principles upon which the general organization of the Institution is based.

In accordance with the requirements of its charter, the Institution was duly opened on the seventh of October, 1868.

THE UNIVERSITY AND THE NATION.

The Act of Endowment passed by Congress—already referred to, and given in full in THE REGISTER of 1868–69—provides for the support and maintenance of colleges, "where," in the language of the Act, "the leading object shall be, without excluding other scientific and classical studies, and including military tactics, to teach such branches as are related to Agriculture and the Mechanic arts." The first step, therefore, in organizing the Institution, was to provide means and methods of instruction in the branches thus indicated.

THE UNIVERSITY AND THE STATE.

The Act of Incorporation after citing the words of the Congressional Act (declaring the leading purpose of the land grant), adds: "And such other branches of Science and knowledge may be embraced in the plan of instruction and investigation pertaining to the University as the Trustees may deem useful and proper."

The ninth paragraph of the original Act of Incorporation provides for the admission to the University of a certain number of State students.

The Trustees of the University have placed the most liberal construction on the law in regard to numbers. They will admit a State scholar from each Assembly District every year, and they continue each of these scholarships through four years. This makes the number of students from this State, on whom the University agrees to bestow its highest privileges, free of all expense for tuition, five hundred and twelve, or four for each of the Assembly Districts, which is equivalent, when all the scholarships are full, to the remission of tuition fees to meritorious students of this State, of the amount of nearly forty thousand dollars *per annum*.

The successful candidate may enter any department or course for which he is prepared—either of the four General Courses, Classical, Scientific, Philosophic, or Literary—or either of the Technical Courses, as Agriculture, Architecture, Chemistry and Physics, Civil Engineering, Mechanical Engineering, or Natural History; or he may, subject to the approval of the Faculty, take an *Optional Course*, under the usual restrictions; or he may devote himself to any one specialty—as, for example, Chemistry in the Laboratory, with a view to Assaying or to some application of Chemistry to Manufactures—provided he show adequate reason and proper preparation for such a course, and devote as much time to this one study as is required of other students in regular courses.

APPOINTMENT OF STATE SCHOLARS.

These State Students are to be selected, by yearly competitive examinations, from the various public schools and academies maintained by the people of New York. No student who has been once admitted to the University is allowed to compete. This is intended to prevent an abuse which might otherwise occur,—young men who had been students for a year or two at the University, going back to their Assembly Districts, entering into the competition at a great advantage, and thus practically nullifying the original design of the law, which intended that the competition should be *bona fide* between scholars from the public schools and academies.

With regard to the times and places at which competitive examinations are held in the various Assembly Districts, each person is advised to consult the School Commissioner of his district, or the Board of Education of the city in which he lives. But they should in all cases be held before the commencement of the Fall Term of the University; otherwise the student will be compelled to wait and thus lose one year of his scholarship. The successful candidate is subject to the usual entrance examination on arriving at the University. This provision, intended as a check upon careless examiners, and to keep the standard of scholarship in the University up to its proper level, will present no obstacle to the candidate who has passed through any competitive examination that is really worthy of the name.

No distinction of sex is recognized in the competitors—the only aim being to secure the "best scholar," as the law requires.

TRUSTEES.

The number of Trustees, when the Board is complete, is twenty-three. Of these, the eldest son of the Founder is, by the law of the State, a non-elected Trustee. Seven others are members of the Board by virtue of the offices which they hold. The *ex-officio* Trustees are the following:—

1. The President of the University.
2. The Governor of New York.
3. The Lieutenant-Governor.
4. The Speaker of the Assembly.
5. The Superintendent of Public Instruction.
6. The President of the State Agricultural Society.
7. The Librarian of the Cornell Library.

The remaining fifteen are elected for a term of five years, three retiring each year. By a special clause in the act of organization, the graduates of the University, whenever they shall number one hundred, are entitled to fill the place, each year, of one of the retiring members. It is hoped that this feature will do much to insure constant vigor in the administration of the affairs of the Institution. The time for the election is fixed by the Board of

Trustees for the day preceding the annual Commencement. The Trustees meet twice a year, and at other times as occasion requires; while an Executive Committee of their number, consisting of the Chairman and Treasurer, the President of the University, and other Trustees who live near enough to permit them to be present, hold frequent sessions in Ithaca; and to this Committee the more immediate superintendence of the affairs of the University is entrusted. This Committee has established at the University Buildings a business office, where all contracts made in the name of the University, and all purchases of supplies for the Institution are arranged. Payments to the University, and all disbursements by it, are made only through this office.

THE FACULTY.

The Faculty is divided into resident and non-resident professors. To the former are entrusted all matters of academic government, the supervision of the various courses of study, and such duties as generally appertain to an academic Faculty. The resident Faculty comprises professors and assistant-professors, who are assisted in instruction by several non-resident lecturers and other special instructors. The non-resident professors are men who have been selected from among scholars of acknowledged eminence in particular branches of learning.

The General Faculty is divided into thirteen Special Faculties:

The Special Faculties are those of (1) Agriculture, (2) Architecture, (3) Chemistry and Physics, (4) Civil Engineering, (5) History and Political Science, (6) Ancient Classical Languages, (7) North European Languages, (8) South European Languages, (9) Mathematics, (10) the Mechanic Arts, (11) Military Science, (12) Philosophy and Letters, (13) Natural History. Each of these Faculties have special charge of the studies in some one or more of the General Departments of study.

TERMS AND VACATIONS.

The Academic year is divided into three terms, and there are three vacations.

Commencement comes on the third Thursday in June.

The Fall Term begins, after a vacation of thirteen weeks, on the Tuesday following the eleventh day of September, and ends on the Friday after the fourteenth day of December, making a term of thirteen weeks and four days.

The Winter Term begins on the Tuesday next after the second day of January; except when, in leap year, that Tuesday would be the third day of January, in which case it will begin on the Tuesday after the third.

The Spring vacation extends from the noon of the Friday next after the twenty-third of March until the second Saturday following.

The Spring Term begins on the second Saturday after the close of the Winter Term; the instruction begins on the Monday following, and continues until Commencement; making in all thirty-seven weeks of term-time in the academic year.

For the beginning and ending of terms and vacations of each year, and other matters of detail relating to them, see the Calendar, p. 7 of this REGISTER.

THE UNIVERSITY SYSTEM.

Many of the letters of application and inquiry addressed to the University authorities evince misapprehension in regard to its plan and organization. This has rendered the subjoined statements necessary:—

1. *The University is not a school for instruction in preliminary English branches.* The public schools and academies have been munificently endowed by this and other States for this very purpose. Were the University to devote itself to this instruction it would depart from its true aim. It is established to take scholars where the common schools of the higher grades and the academies leave them, and to carry them on in still higher paths of study and research, and in certain special departments which require great concentration of educational resources. Therefore, an examination is held, on entering, in those branches which all schools and academies ought to teach. And candidates for admission, to whatever course, are urged to apply themselves carefully to those requisite studies—English Grammar and Orthography, Geography, Arithmetic, and Algebra through Equations of the Second Degree.

2. *The University maintains no preparatory department.* Candidates for admission, whose deficiencies are slight and of such a character that they can soon be made up, are admitted conditionally—the condition being that they pass satisfactorily a second examination within a short time after the admission. But such persons are expected to perfect their preparation under the care of tutors approved by the Faculty.

3. *The University is not a reforming establishment.* Its work is to aid earnest young men and women in obtaining the best education which their talents allow. To this the professors will direct all their efforts. But they will not undertake to strengthen weak characters, or reform vicious ones. Whenever it shall appear that any young man is pursuing such a course as to render his stay not conducive to his own interests, or to those of the University, measures will be at once taken for his exclusion.

4. *The University is open to students from any State or country.* Free instruction for undergradutes is given only to State Students, and to those in the Department of Agriculture. The State Students are confined, of course, to the State of New York But all others are received, whatever may be the State or

country of their residence, upon equal terms with students from the State of New York.

SPECIAL FEATURES.

The points in which the University differs from most of the other institutions of learning in this country may be summed up, in brief, as follows:—

1. *The addition to the ordinary governing Faculty of a number of Non-resident Professors and Lecturers*, some of whom deliver each year courses of lectures upon subjects in the investigation of which they have acquired a high reputation.

2. *Liberty in the choice of studies.* Several courses, carefully arranged, are presented, and the student, aided by friends and instructors, can make his selection among them; he may also, from among the various branches pursued at the University, form for himself an entirely independent course, subject to the approval of the Faculty; or he is permitted, upon proper representations to the Faculty, to devote himself, as a special student, to a single department of study.

There must of necessity be some limit, however, in all cases, to the liberty of choice in the selection of studies by the student; the studies in an advanced stage of any department often presuppose those that occur at an earlier stage, in such a way that the one cannot be pursued without a previous knowledge of the other. And in all cases it is found that the studies which are placed in the more advanced stages of any Course, are such that for the most satisfactory prosecution of them, both the acquired knowledge and the mental culture which result from the pursuit of those that come earlier in the Course are essential. Hence the Faculty, while desirous of allowing as much liberty of choice as is practicable, feel it to be a duty to inexperienced students to restrain them from selections that can not but be disadvantageous to their own interests.

3. *The Prominence given to studies which will be practically useful.* The variety of instruction offered enables the student to acquire such knowledge as is likely to agree with his tastes, encourage his aspirations, and promote his work in life. The ancient classics are provided for; but particular attention is also paid to the modern classics, especially those of our own language. Among the subjects which are carefully treated may be mentioned History and the various historical studies; Political and Social Science; the Natural Sciences; the Application of Science to the Arts; and Human Anatomy, Physiology and the Laws of Health.

4. *The absence of a marking system determining the relative rank of each student in his class.* This practice, which has so often destroyed all capacity among students to seek knowledge for its own sake, has been abolished.

RELIGIOUS INSTRUCTION.

The University was established by a government which recognizes no distinction in religious belief, and by a citizen who holds the same view. It would be false to its trust were it to seek to promote any creed or to exclude any. The State of New York, in designating it as the recipient of the bounty of the general government, has also declared the same doctrine. By the terms of the charter, no trustee, professor, or student, can be accepted or rejected on account of any religious or political opinions which he may or may not hold.

In the University Chapel—the gift of Henry W. Sage—religious services are held, in connection with discourses to be delivered by clergymen of the various Christian denominations, selected, from time to time, in such a way as to give the best representation of the religious thought of the age, and to exemplify the influence of Christianity upon the world. These discourses are delivered during the first and third terms of each year, and usually two on each Sunday.

HIGHER EDUCATION OF WOMEN.

It was the wish of the Founder and other influential friends of the University, from the first, that it should be open and its means and facilities for education should be offered to all, irrespective of sex, color, or nationality. And by an act of the Trustees, passed in April, 1872, women are to be admitted to the University on the same terms and conditions as men, except that they must be seventeen years old. A separate building—the Sage College for Women has been completed and is in readiness for use. There is no separate Course or Department for women students, the Entrance Examinations are the same for them as for the young men and depend upon the course they intend to pursue. Neither are there any separate classes formed for them, the only distinction made is, that a separate building has been provided by the liberality of Mr. Sage for them to live in, if they choose to avail themselves of the opportunity. While the leading object of the movement is perhaps to give to the young women of our country an opportunity for the pursuit of the higher studies of a university course, those who have been chiefly instrumental in making these arrangements, are earnest believers in the co-education of the sexes.

RESIDENT GRADUATES.

A University, in order to be worthy of the name, should provide for the prosecution of study to any extent that may be required. Commencing in the common schools, we have an ascending gradation through academy, college, etc., up to the fullest development of educational resources in a well endowed and completely

equipped university, with its technical departments for the useful Arts and its professional schools for the learned professions of Law, Medicine and Divinity. At a certain stage in this course, the student is expected to take his first or Baccalaureate Degree. He is then to be regarded, however, as having merely laid the foundation for his professional career. His studies must have been, to a large extent, theoretical, and can scarcely be considered as anything more than a preliminary preparation for what is to be the work of his life. He needs more study; and in some departments much practice, before he can be considered qualified to take an independent and leading position. Books, and means of that kind, are still indispensable; and the aid of accomplished and experienced teachers is of great value. Accordingly, while the Cornell University does not contemplate any immediate movement in the direction of founding *professional* schools in Divinity, Law, or Medicine,—there being already an abundance of such schools in the country—it does contemplate, and has provided to some extent, for the wants of those who have taken their first or Baccalaureate Degree, and who wish to further prepare themselves in the various departments of post-graduate studies. For such purposes, its Library and Museums, including the instruction of its professors, are placed at the service of its own graduates, and of the graduates of like standing from other colleges and universities *free of charge*, for tuition and use of Library, Museum, etc., they being required to pay for only the material they have occasion to use in the prosecution of their studies and investigations. Already quite a number of these post-graduates have manifested a disposition to avail themselves of the opportunities here afforded them, and this number is yearly increasing. For such students, advanced degrees have been provided. Those degrees can be taken only on condition that the preparatory work requisite for them shall have been fully and faithfully performed.

It is not necessary, however, that each student pursuing post-graduate studies should be a candidate for any second degree. He may enter the University for a longer or a shorter time, and pursue any one branch of study and investigation, however circumscribed in its character, until he shall have accomplished the object of his wishes. Or, he may at the outset intend to take a second or advanced degree; in which case he should announce his intention at the time he enters the University as a Resident Graduate, and place himself under the advice and instruction of the appropriate professor or Special Faculty.

SELF-SUPPORT BY STUDENTS.

Young men having some special trade, as that of carpenter, mason or machinist, may in some cases mainly, and in a very few cases entirely, support themselves while carrying on their studies. Yet no young man should come to the University without resources. Self-

support, to any extent, requires energy, persistence and sacrifice; and even a skillful mechanic should have some means in reserve, so that his energies in the University will not be diverted from mental to manual labor. Most of those desiring employment are young men who can give only unskilled labor. The price paid for such labor is just what would ordinarily be paid to other parties doing the same work: but as a student has usually less muscular development than an ordinary laborer, his earnings must be less. The number of young men applying for such labor has constantly exceeded the number that the University is able to employ; and it must be distinctly understood that the University will not *guarantee employment to any student.*

THE UNIVERSITY TOWN.

The University is situated on grounds overlooking ITHACA, a town of about twelve thousand inhabitants, at the head of Cayuga Lake, in Tompkins County, New York.

The town has five distinct lines of communication with the great thoroughfares, viz:

The *Geneva, Ithaca and Sayre Railroad*, running south, connecting with the Lehigh Valley Railroad for Towanda, Bethlehem, Philadelphia, etc; running north-west to Geneva and Lyons on the New York Central and Hudson River Railroad. The *Cayuga Railway*, running north to Cayuga on the New York Central and Hudson River Railroad. The *Cayuga Lake Steamers*, during navigation, running north to Cayuga on the New York Central and Hudson River Railroad. The *Cayuga and Susquehanna Division* of the *Delaware, Lackawanna and Western Railroad*, running south to Owego on the New York, Lake Erie and Western (formerly Erie) Railway. The *Utica, Ithaca and Elmira Railway* starts from the immediate vicinity of the University buildings and, running north-east, connects at Cortland for Syracuse and at Canastota with the New York Central and Hudson River Railroad; running south-west to Elmira on the New York, Lake Erie and Western (Erie) Railway, connects with the Northern Central Railway for Harrisburg, Baltimore, Washington, etc.

SCOPE OF THE INSTRUCTION.

Mr. Cornell, whose gift was bestowed for the purpose of rounding the Institution into the proportions of a true university, expressed his wish in these words :—"*I would found an institution where any person can find instruction in any study*"—words which plainly and tersely express the whole University theory.

While the Congressional and State Acts, from which we receive a large part of our endowment, specially require that Agriculture and Mechanic Arts shall be made leading departments, they do not preclude other scientific, literary and linguistic studies; and the bounty of Mr. Cornell enabled the Trustees at the outset to make liberal provisions for them.

The instruction given in the University is distributed into several Departments, some of which are subdivided into Schools; and out of these Schools and Departments there are made up four General Courses and six Technical or Special Courses, as will be seen more fully below under the head of "Courses of Study."

I. DEPARTMENT OF AGRICULTURE.

The simple requirements for admission to the Course in Agriculture put the advantages which it offers within the reach of every enterprising young man, who has made good use of the instruction afforded him in the public schools; and it is not possible for such a person to spend two, three, or four years in the course of study and practice which may be followed out here, without becoming much better able to meet successfully all the varied emergencies of his calling, as well as of his citizenship. If there are pecuniary difficulties in the way, they may be obviated to some extent, by the opportunity afforded for labor on the farm, or in the gardens; preference will be given to students in Agriculture before any others who may wish for this work.

The instruction is given by lectures and recitations, and illustrated with the aid of the Auzoux models of plants, and domestic animals and parts of animals, and various other collections belonging to this and other departments of the University. Besides the

class-room exercises, the student devotes as much time as can be profitably spared for the purpose, to actual practice in the botanical, chemical and veterinary laboratories, as well as in the fields and barns.

Students in the Department of Agriculture enjoy, in common with all members of the University, the privilege of using the University Library, and of attending any lectures given in the University.

In Practical Agriculture five hours weekly during the senior year are devoted to technical instruction; this time being divided between lectures, reviews, agricultural calculations and farm accounts. Besides this the students will be required to spend three hours a day two days in each week in field practice, and in the handling and feeding of domestic animals; and if this amount of practice does not prove sufficient to make each student expert in the various operations of the farm, enough additional time will be required of him to accomplish the desired object. And as the summer vacation occurs at a period of the year most favorable for instruction upon the farm, every student intending to graduate will be required to spend a large part of the vacation preceding his last year at the University upon the farm, when, if he chooses to take part in the regular operations, he will be paid according to his ability to work, so long as his labor is required.

Tuition is *free of charge*. Students in Agriculture, whether optional or in either of the two regular courses, are required to do a certain amount of farm work *without compensation* as part of their instruction.

The largest portion of work on the farm, and in the gardens, will necessarily be performed by hired laborers who give all their time to it. As already intimated, however, ample opportunity to engage in this work for compensation will be afforded to students who desire it; but the judicious management of the estate, as well as the best interests of the students themselves, demand that no more shall be paid for any labor than it is worth.

Text-Books.—Caldwell's "Agricultural Chemical Analysis;" Johnson's "How Crops Grow" and "How Crops Feed;" Gray's "School and Field Book of Botany," and "Manual of Botany;" Darlington's "Useful Plants;" Thomas's "American Fruit Culturist;" Kent's "Landscape Gardening."

Books of Reference.—Morton's "Cyclopædia of Agriculture;" Anderson's "Agricultural Chemistry;" Knop's "Kreislauf des Stoffs;" Boussingault's "Chimie Agricole;" Fresenius's "Chemical Analysis;" Gray's "Structural Botany;" Lindley's "Vegetable Kingdom;" Downing's "Landscape Gardening."

VETERINARY SCIENCE.

The regular course for students in Agriculture, Natural History, etc., embraces:—1. Five lectures a week extending over the entire academic year. 2. Laboratory work on the bones, skeletons,

elastic models, pathological preparations, and parasites of the domestic animals. 3. Clinical instruction on cases occurring in practice.

The lectures of the First Term are devoted to the anatomy and physiology of the animals of the farm, the various systems of organs and functions being taken up in turn and the differences pointed out together with the bearing of these variations on their healthy management and diseased processes. Attention is given to the principles of hygiene as affected by genus, breed, climate, soil, exposure, buildings, ventilation, drainage, food and water; to the varying anatomical peculiarities which imply special aptitude for particular uses, such as draught, speed, endurance, early maturity and propensity to fatten, milking qualities, etc.; to the data for determining the age; to the principles of breeding, of shoeing, etc.

The Second Term is appropriated to lectures on general comparative pathology, on specific fevers and other contagious diseases, on the parasites and parasitic diseases of the domestic animals, and on constitutional diseases. An important feature in this course is the subject of Veterinary Sanitary Science and Police, embracing as it does the prevention of animal plagues by legislative and individual action; the improvement of unhealthy localities; and the destruction of animal poisons and parasites which are intercommunicable between man and the domestic animals.

In the Third Term the lectures treat of the local diseases of the various systems of organs in the different animals and of veterinary surgery. The general principles which must guide in all surgical manipulations are stated, the various operations practiced on the domestic animals are described, and these are illustrated when suitable subjects present themselves.

In Veterinary Science an opportunity is afforded to students who desire it, to pursue the study of Veterinary Medicine and Surgery farther than is provided for in the regular courses of study of the School.

Text-Books.—Chauveau's "Comparative Anatomy of the Domestic Animals;" Colin's "Physiologie des Animaux Domestiques;" Marshall's Outlines of Physiology;" Law's "Principles and Practice of Veterinary Medicine and Surgery."

Books of Reference.—Leyh's "Handbuch der Anatomie der Hausthiere;" Gamgee and Law "Anatomy of the Domestic Animals;" Stephen and Seller "Physiology at the Farm;" Goodale's "Breeding;" Low's "Domesticated Animals;" Gamgee's Domestic Animals in Health and Disease;" Percivall's "Hippopathology;" Williams' "Principles and Practice of Veterinary Medicine and Surgery;" Röll's "Lehrbuch der Pathologie und Therapie der nutzbaren Thieren;" Lafosse's "Traité de Pathologie Vétérinaire;" Baumeister's "Geburtshülfe;" Rainard's "Parturition;" Delwart's "Parturition;" Fleming's "Veterinary Sanitary Science

and Police;" Reynal's "Traité de la Police Sanitaire;" Miles "On the Foot;" Rey's "Marechalerie;" Bouley and Reynal "Dictionaire de Médicine Vétérinaire."

II. ARCHITECTURE.

The course of study in Architecture is arranged with a view to giving the student thorough instruction on the subjects which it is necessary that he should understand, in order to be competent to enter upon the practice of the art. The lectures by the professors of the Faculty and their assistants cover the whole ground of the requisite knowledge, practical, scientific, historical, and artistic. Building materials and methods of construction are fully discussed. Drawing is practiced in every term of the four years' course. In mathematics the student is required to study descriptive geometry, and its applications to shades, shadows, perspective, and stereotomy. He also takes such portions of Mechanics as are specially useful to him; the subjects of arches, trusses, retaining walls, etc. The various styles of architecture are explained and illustrated, historically and critically. Composition and the art of designing, sculpture and painting in their relations to architecture, acoustics, ventilation, and kindred subjects, are treated of. The object is not chiefly to develop the artistic powers of the student, but rather to lay that foundation of knowledge without which there can be no true art.

Students not in the full course may take a partial course not leading to a degree, consisting of mechanics, building materials and construction, styles of architecture, draughting and designing, which can be completed in about two years.

III. CHEMISTRY AND PHYSICS

I. SCHOOL OF CHEMISTRY AND MINERALOGY.

The instruction in chemistry begins with the lectures on general chemistry in the second term of the Sophomore year. During that and the succeeding term three lectures a week are given on the theoretical principles and the general study of the chemistry of inorganic bodies. In addition to the final examination at the end of each term occasional examinations are held during the term of which no previous notice is given, the students being expected to hold themselves in readiness for such an examination at all times. During the first term of the Junior year a course of lectures will be given on the chemistry of organic bodies; it will be restricted to the consideration of the more frequently occurring bodies of organic origin, which the student is constantly meeting in his every-day life.

The Introductory Chemical Practice may be taken in the second Sophomore term, but is required of all students in the

Special Course in Science in the third term. This practice consists in the performance by the student of a series of experiments contrived and arranged for the illustration of the more important general principles of chemistry, as well as for the cultivation of his powers of observation; while the details of the manipulation of each experiment are carefully described, the student is required to observe the results for himself and trace their connection with the principle illustrated.

The Special Chemical Course.—This is arranged for those desiring to accomplish as much as possible during the four years of a college course towards fitting themselves for the profession of chemistry. It includes, besides some study of other sciences, of mathematics, and French and German, attendance on lectures on general, organic, technical, and analytical chemistry, and a course of practice in qualitative analysis, including blow-piping, and in quantitative analysis, including assaying, the analysis of ores and minerals in the wet way, of organic substances, waters, gases, articles of food, etc.

Agricultural Chemistry.—This comprises a course of lectures on the chemistry of the elementary and compound substances concerned in the growth of plants and animals, the chemistry of vegetable and animal life, of soils and manures, and of agricultural technology. The laboratory practice, except in the full course of four years, is confined to the qualitative and quantitative analysis of such substances as may be met with in the course of ordinary agricultural practice, and requires from four hundred to four hundred and fifty hours for its completion.

Chemical Technology.—A course of lectures is given, in the third terms of two successive years, on the applications of chemistry in the arts and industries. It will embrace the study of the chemical principles involved, and of the manipulation required, in the commercial preparation of acids, alkalies, salts, fats, oils, soaps, coal gas, coal tar, coloring matters, glass, pottery, mortars, textile fabrics, leather, paper, etc. The course will be supplemented by excursions to such mills and manufactories as are accessible, and by special laboratory practice in the detection of adulterations, and the valuation of commercial samples.

Medical Chemistry.—This course was arranged at the suggestion of the Professor of Comparative Anatomy and Zoology, for students intending to follow the profession of medicine. It is confined exclusively to analytical practice, and its object is to enable the student to execute many of the more simple qualitative and quantitative analyses that will be useful to him in his professional practice. To carry out this course successfully, about three hundred hours of actual practice should be given to it.

Course in blow-piping.—This course, for students in Engineering, is intended to give them such facility in the use of the blowpipe in determinative mineralogy as will enable them to avail themselves of this most useful instrument in their field work,

when it becomes necessary to make out the character of a rock or mineral.

Metallurgy and Mineralogy.—During the second term two lectures a week are devoted to each of these subjects in alternate years. The course in Metallurgy is intended to give the students in the technical courses a general idea of fuels, ores, and the most important methods of extracting the various metals which are especially used in construction; the metallurgy of iron claiming naturally the most attention. A certain amount of laboratory work in Blow-pipe Analysis with practice in the identification of crystalline forms is required in connection with the lectures on Mineralogy.

Laboratory expenses.—Students in the laboratory will be charged with the actual cost of the gas consumed, and will be supplied with apparatus and chemicals at current prices. They will be required to make a deposit with the Treasurer of a small sum to cover these charges, before beginning work in the laboratory, except when delay is allowed by special permission of the professor in charge.

Text books and works of reference.—Thorpe "Inorganic Chemistry;" Barker, "College Chemistry;" Caldwell and Breneman, "Introductory Chemical Practice;" Crafts, "Qualitative Analysis;" Fresenius, "Qualitative Chemical Analysis" and "Quantitative Chemical Analysis;" Caldwell, "Agricultural Chemical Analysis;" Elderhorst, "Blow-pipe Analysis;" Kerl, "Probirkunst;" Plattner, "Use of the Blow-pipe;" Sutton, "Volumetric Analysis;" Mohr, "Titrirmethoden;" Thorpe, "Quantitative Chemical Analysis;" Rose, "Chimie Analytique;" Burdon-Sanderson, "Handbook for the Physiological Laboratory;" Storer, "Dictionary of Solubilities;" Gmelin, "Handbook of Chemistry;" Miller, "Elements of Chemistry;" Watts, "Dictionary of Chemistry;" Schorlemmer, "Organic Chemistry;" Wurtz, "Dictionnaire de Chimie;" Graham-Otto, "Lehrbuch der Chemie. Handwörterbuch der Chemie."

II. SCHOOL OF PHYSICS.

The instruction in the general course in Physics begins with the first term of the second year and continues six terms, as follows:—

First term.—Mechanics of solids, liquids, and gases. Three exercises per week. *Second and third terms.*—Magnetism and electricity. Two exercises per week. *Fourth term.*—Heat. Two exercises per week. *Fifth and sixth terms.*—Acoustics and optics. Three exercises per week.

It is desirable that each student should be provided with Deschanel's Natural Philosophy. The following are other works of reference;—Atkinson's Ganot's "Physics," Jamin's "Cours de Physique" and "Petit Traité de Physique," Müller's "Lehrbuch der Physik," Peck's "Mechanics" and Ball's "Experimental Mechanics," Jenkin's "Electricity and Magnetism," Maxwell's "Theory of Heat," Schellen's "Spectrum Analysis."

Besides the above general course, there will be an opportunity for a few students who wish to make Physics a specialty during the senior year, to pursue in detail such branches as they may select. The instruction will be conducted in the physical laboratory. The student will first be taught to use the various instruments. He will then perform a series of experiments designed to test the truth of physical laws, and at the same time furnish an exercise in determining the probable error of experimental results. He will finally pursue some systematic investigation, which will give him experience in the preparation of apparatus for special researches.

It will be the object of the whole course:—First—To give the student a thorough knowledge of the subject. Second—To give him experience in the use of apparatus. Third—And most important of all, to teach him to experiment with care, and observe with precision.

If any of the students who take this course desire to become teachers of Physics, they may devote a considerable portion of their time to the performance of illustrative experiments.

IV. CIVIL ENGINEERING.

The methods of instruction include the use of text-books, which are changed from time to time, lectures profusely illustrated on the screen, or by diagrams or models, and actual practice in the field, laboratories and workshops.

Besides the application of the higher analysis to the solution of engineering investigations, the professional preparation of the students comprises the following subjects:—Free-hand drawing, machine-shop practice, blowpipe analysis of minerals, geology, elementary and structural, metallurgy; the location and construction of railroads, canals and water-works; the surveys and improvements of coasts, harbors, rivers and lakes; the determination of geographical and astronomical co-ordinates; the application of mechanics and descriptive geometry to the construction of the various kinds of arch bridges; the design and construction of roofs and trusses, girders and suspension bridges; the design, construction and application of wind and hydraulic motors, air and steam-engines; the construction and management of iron, steel, chemical and pneumatic works; the preparation of the various kinds of drawings and projections used by the engineer, and the application, selection and tests of the materials used in constructions, and the frequent preparation of papers and essays on subjects of professional importance, designed both as a literary exercise and to increase the student's knowledge of some particular subject, which he is thus required to investigate.

The sphere of action of the Civil Engineer is so broad and diversified, that no educated engineer pretends to be equally well prepared in all the various specialties into which the profession has been subdivided by social necessities and common consent. To

meet the loud demand for special engineering studies, efforts will be made from the beginning of the third year of the course, to allow of option and diversity of special studies, so far as the means at our disposal will allow. In this manner this department will foster the development of special fitness among the various classes of students, who by natural inclination may prefer a more or less extended study of any particular branch of Civil Engineering.

The great subdivisions of the work under this department are:—Hydraulic engineering, railroad engineering, bridge architecture and construction, topographical engineering, industrial engineering and mining engineering.

At present we have no more than general facilities for beginning the education of Industrial and Mining Engineers, and we are not prepared to offer superior inducements to students pursuing these important branches as a specialty. Appropriate chairs for this purpose will be created at an early day.

We can offer, however, a complete theoretical and practical course in Civil Engineering, embracing a thorough treatment of the first four great subdivisions enumerated above.

The course in Topographical Engineering is designed for those students who may find distasteful the investigation of the higher mechanics as applied to civil constructions, and who may show, instead, special aptitude for geodetical work. Since the recent great surveying expeditions sent out by the U. S. government took the field, there has been an incessant demand for men specially fitted for the important duties of the explorer and the geographical engineer; and in the work of our well known U. S. Coast Survey, there is also an ample field for the efforts of properly trained geographers and topographers. To provide for this and similar demands, a special course is now in full operation. It is properly manned by efficient instructors and its equipment of general and special instruments has been collected at great expense and is very complete. During their connection with this department students taking the course in Topographical Engineering will have an opportunity to perform work as accurate and extensive as is done in the actual details of the U. S. Coast Survey, and in the geodetic surveys of European governments.

Besides the above, there is a course in Surveying and another course in Draughting, for either of which a licentiate certificate is conferred.

The course in surveying comprises the following subjects:—Algebra, geometry, trigonometry, physics, mensuration, descriptive geometry, higher geodesy, plotting and chart projections, and pen and colored topographical drawing.

The course in draughting embraces the following:—Algebra, geometry, trigonometry, mensuration, plotting, descriptive geometry, shades, shadows and perspective, lettering, tinting, shading, pen and colored topography, machine drawing, and the use of projection tables.

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The degree of Civil Engineer is conferred (1) on those who have completed the five years course and (2) on those who take the Bachelor's degree in Engineering, after two years spent in practice and study, on passing the requisite examinations and presenting a satisfactory thesis.

V. HISTORY AND POLITICAL SCIENCE.

The historical and political sciences are taught chiefly by lectures. The lectures upon history are so arranged as to form a chronological sequence—ancient history being followed by the early modern period, that by the mediæval and later modern history, and that again by the history of England and the constitutional history of the United States. The elementary facts bearing upon the history of the principal continental nations of Europe are taught in the Department of Languages—much of the collateral reading recommended being in French and German. The student, therefore, comes to the lectures prepared to avail himself of the opportunities they offer. Special attention is also paid to Greek and Roman history in connection with the study of the classics in the Course in Arts. The department is well supplied with illustrative material in the shape of mural charts, photographic views, portraits, casts, and diagrams—the collections including the historical wall maps of Sprüner and Bretschneider, the political wall maps of Sydow, and the various special charts issued by Kiepert and others.

In connection with the lectures, students are expected to make constant use of the University Library—which is well supplied with works on ancient, English, American, and general history. The examinations in history are chiefly by written papers; and theses on historical subjects are occasionally required. The main efforts of the professors are given to imparting a good knowledge of general history, to developing ideas of the philosophy of history, and to bringing this knowledge to bear upon the most important points of modern civilization.

The School of Political Science is intended to embrace all the important topics connected with political and social science.

The following is a list of the lectures given in this department: (1) A course of lectures on Ancient, Roman and Mediæval history, by Professor Russel. (2) Modern history, and the philosophy of modern history, by President White. (3) The general and constitutional history of England, by Professor Goldwin Smith. (4) General history, and the philosophy of history, by Professor Wilson. (5) History of the United States, by Professor Russel. (6) Political economy, by Professor Wilson. (7) A course of lectures on the constitution of the United States and American jurisprudence, by Professor Wilson.

VI. LANGUAGES.

The instruction given in this general Department is distributed to three different Schools:—

I. SCHOOL OF THE ANCIENT LANGUAGES.

I. THE GREEK LANGUAGE.

FIRST YEAR.—Xenophon (selections from the Cyropædia), with Goodwin's Greek Moods and Tenses, and exercises in writing Greek: Homer (selections from the Iliad), with Grote's History of Greece, volume II.

SECOND YEAR.—Plato (Apology and Crito), with Grote's History of Greece, volume VIII; exercises in writing Greek: Euripides (Phoenissae); Æschylus (Septem); Aristophanes (Acharnians).

THIRD YEAR.—Thucydides (selections), with Grote's History of Greece, volumes VI and VII, and Curtius' History of Greece, books III and IV; Greek philology and composition: Sophocles (Ajax, Oedipus Coloneus): Plato (Protagoras).

FOURTH YEAR.—Demosthenes (public orations), with Grote's History of Greece, volume XI; Greek philology and composition: Æschylus (Agamemnon); selections from Pindar and Theocritus.

The reading of the authors is accompanied by lectures, introductory and exegetical, on Greek literature and antiquities.

2. THE LATIN LANGUAGE.

FIRST YEAR.—*First Term.*—Livy (selections). *Second Term.* —Cicero (Essays and Letters.) *Third Term*—Horace (Odes and Epodes).

SECOND YEAR.—*First Term.*—Horace (Satires and Epistles). *Second Term.*—Quintilian (Books X and XII). *Third Term.*—Tacitus (Agricola and Germania).

THIRD YEAR.—*First Term.*—Plautus and Terence. *Second Term.*—Cicero (Orations or Dialogues). *Third Term.*—Juvenal and Persius.

FOURTH YEAR.—*First Term.*—Pliny (Letters) and Tacitus (Annals). *Second Term.*—Lucretius and Virgil. *Third Term.* —Catullus.

The study of the authors is accompanied by exercises in Latin composition and by lectures on the language, literature and antiquities of Rome.

3. LIVING ASIATIC AND ORIENTAL LANGUAGES.

The languages in this school are entirely optional and none of them required for any degree conferred by the University.

The instruction in this Department is given for the present by Professors Fiske, Rœhrig and Wilson, and is distributed as follows:

The Modern Persian is taught by Professor Fiske. There have already been several classes in this language and the Professor is ready to begin a new class whenever there are students desirous of pursuing it.

Professor Rœhrig gives the instruction in the living Asiatic Languages and in the Sanskrit, Old Persian and Arabic. Prof. Rœhrig commenced with an elementary course in *Chinese*, which lasted two years. He then added instruction in *Japanese* (grammar, practical exercises in the Hiragana character, etc.) At the same time he delivered lectures to the students on *Mantchoos*, *Turkish*, the *Tartar Languages*, *Turanian Philology*, etc. A two years' course of Arabic followed, and finally Sanskrit has become one of the principal objects of this department.

The Professor also presents to his classes, in succession from year to year, grammatical outlines and philological sketches of such languages of the East, as may be most instructive and of particular interest to the student of ethnographical philology and general linguistic science.

Text books used, and course of Sanskrit studies.—Bopp's Grammar; Practical Exercises. Selections from the Hitopadesa; from the Mahabharata, and other Sanskrit works. Also occasionally, lectures on Sanskrit Literature, and on special subjects connected with Sanskrit Philology.

The Hebrew, Chaldee and Ancient Syriac are taught by Professor Wilson whenever there are classes desiring them.

II. SCHOOL OF MODERN LANGUAGES.

The object of the professors in this school is to teach the students the principles of grammar and the use of idioms, with a knowledge of pronunciation, so that, at the end of the course, each of them may be able to read any modern work, and to write with some degree of facility.

In the Course in Science both French and German are required, and each must be studied two years. In the Courses in Arts, Philosophy and Literature, less time is required in the study of the modern languages, but ample opportunities are afforded to those who wish to learn them.

I. THE LANGUAGES OF THE SOUTH OF EUROPE.

French.—During the first term Otto's "French Grammar" is studied. This is completed in the second term, and translation is begun, and is continued through the third term. In the second year French plays are translated. After two years, French is optional with all, and those who pursue it will read the masterpieces of French literature.

Italian.—First Year.—Sauer's Grammar, "Il Vero Amico," comedy of Goldoni, and Manzoni's "Promessi Sposi."

Second Year.—Dante's "Inferno," selected stories from Boccaccio's "Decameron," and lectures on Italian history and literature.

Spanish.—First Year.—Montague's Manual Grammar in connection with exercises in writing; Padre Isla's translation of Le Sage's "Gil Blas," and Moratin's "El Si de las Niñas."

Second Year.—Calderon's "El Principe Constante," and lectures on Spanish history and literature.

2. THE GERMANIC LANGUAGES.

German.—The Course may be completed in three years, or nine terms, as follows:—*First Year*,—(Second year in the Course in Science). Comfort's "Method" is used during the Fall and Winter terms, alternating in the latter term with Whitney's "German Reader," and accompanied by exercises in German geography and geographical nomenclature. In the Spring term the classes read poetical selections and a series of extracts from German writers illustrating the most important events in German history. *Second Year.*—Schiller's "Wilhelm Tell," or some similar dramatic work, is used as the text-book in the Fall term, followed, in the later terms, by Lessing's "Nathan der Weise," and prose reading. After the second year of German or the third year in the Course of Science, German is optional.

Third Year.—The reading consists of the first part of Goethe's "Faust," completed during the Fall term, after which come lectures on German history and literature. Whitney's "Grammar" is used in all the advanced classes. The classes are required to attend Professor Bayard Taylor's and Professor Boyeson's lectures on German literature. Instruction is also given to special classes in Old and Middle German.

Scandinavian Languages.—These are taught chiefly through German. In Swedish and Danish the text-books are the "Schwedische Grammatik," or the "Dänische Grammatik" in the Ollendorff series; and Tegnèr's "Frithiofs Saga," Oehlenschläger's "Norden's Guder." Lectures are given on Scandinavian history and literature. In Icelandic, the text-books are Wimmer's "Altnordische Grammatik" with the use of Cleasby and Vigfússon's "Icelandic-English Dictionary."

VII. MATHEMATICS AND ASTRONOMY.

In this department there are two courses marked out, one or the

other of which is pursued wholly or in part by every student who is expecting to graduate in any course except Natural History.

The fuller course is designed especially for students in Architecture, Civil and Mechanical Engineering, and those whose professional pursuits are to be largely dependent on Mathematics. It is also designed to meet the wants of those who take the technical course in Mathematics or pursue the subject with special reference to preparing themselves for teachers.

The other course is designed for those who do not intend to pursue the subject any further than is required in the General Courses and in the Courses of Agriculture, and Chemistry and Physics.

FIRST OR FULLER COURSE.

FIRST YEAR.—*First Term.*—Algebra. *Second Term.*—Theory of equations and spherical trigonometry. *Third Term.*—Harmonoid geometry and geometrical conics.

SECOND YEAR.—*First Term.*—Analytical geometry. *Second Term.*—Analytical geometry of three dimensions and calculus begun. *Third Term.*—Calculus.

THIRD YEAR.—*First Term.*—Integral calculus. *Second Term.*—Theory of functions and calculus of variations. *Third Term.*—Differential equations.

FOURTH YEAR.—*First Term.*—Analytic and celestial mechanics. *Second and Third Terms.*—Philosophy of mathematics with reviews.

SECOND COURSE.

FIRST YEAR.—*First Term.*—Algebra. *Second Term.*—Solid geometry. *Third Term.*—Trigonometry and mensuration.

SECOND YEAR.—*First Term.*—Analytic geometry, plane and solid. *Second Term.*—Calculus and astronomy.

The whole of the first course is required in the Technical Course of Mathematics. It is required through the third term of the calculus ending with the first term of the third year in the Course of Civil and Mechanical Engineering, and through the second term of calculus ending with the third term of the Sophomore year, except the harmonoid geometry, in Architecture.

Any student in any of the courses who chooses to do so may take the mathematics of this course with the permission of the professor in charge of the department.

For post-graduates and special students other subjects are offered if they are desired, as quaternions, quantics and the theory of numbers.

In the latter portions of the fuller course and for post-graduate studies French and German text-books will be used.

Descriptive astronomy will form a part of each course.

Throughout the course in mathematics and in all the mathematical classes there will be frequent examinations during the term, besides the general term examination at the end of each term. These will often be given without notice, and extend to previous work. They will test the student's mastery of general principles and methods, quite as much as of details.

VIII. MECHANIC ARTS.

This is one of the departments for which the University is bound by the Land Grant to make special provisions. Professorships of Industrial and Practical Mechanics were early established and filled. Models illustrating mechanical movements, and the various classes of motion, and of engineering construction had been imported. A large amount of machinery had been acquired. But in 1870, the Honorable Hiram Sibley provided for the erection of a special building for this department. He also gave ten thousand dollars for increasing its furniture, and has since enlarged his gift by a further donation of thirty thousand dollars for the endowment of the Professorship of Mechanical Engineering and Machine Construction. This department has thus been placed in a condition to do its work in a most satisfactory manner. There are now closely connected with the lecture-room, in which the *theoretical* side of the Mechanic Arts is presented, other rooms for the designing and modeling of machinery, and workshops fitted with power and machinery for working in wood and metals, in which the *practical* side will be conducted.

The machine-shop is to be conducted wholly as a means of instruction, and each student in the department will be required to devote at least two hours per day to work in the shop; so that he will not only get theory and practice combined, but he will also have opportunities to construct and use tools of the greatest precision. Each candidate for the degree of Bachelor of Mechanical Engineering will be given an opportunity to design and construct some machine or piece of apparatus, or conduct a series of experiments, approved by the department, such as promise to be of public utility. While the University does not propose to remunerate students for their labor, or guarantee any return except instruction, advanced students will be allowed, to a certain extent, to make tools or small articles for themselves. But in all cases they must work from approved plans and by the consent of the director of the shop. Materials wasted, or tools injured, will be charged to the student wasting or injuring them.

The instruction in shop-practice embraces work requiring the use of all hand-tools and the machines employed in the ordinary machine-shops. The work consists in the production of standard tools of the highest excellence, and the building of machines from original designs. With the exception of the standard surface-

plates, gauges, etc., which are only produced to give the students a knowledge of flat, straight, square, and round, together with the correct methods of producing them, there is no one thing or class of things manufactured.

The work is always changing, and the relative kinds of work are proportional to that required in the production of new machinery. By this method it is believed that the students will learn not only the use of tools, but acquire experience also in the development of new designs.

In addition to the Full Course of four years which is given at length, under the heading "Courses of Study," an Optional Course has been laid out, subject to the direction of the Dean. For admission to this course entrance examinations in Grammar, Geography, Arithmetic, Algebra through Quadratics, Physiology, and Plane Geometry are required.

Attendance upon ten lectures or recitations per week, or their equivalent, in addition to two hours' daily shop-practice, two hours' daily drawing, and the passing of the examinations at the close of each term, are necessary to remaining in the University.

MILITARY SCIENCE.

By the Act of Congress creating the Land Grant on which the University is founded, and by the Act of the Legislature of the State of New York assigning that land grant to us, it is obligatory on the University to provide for instruction in Tactics and Military Science. In accordance with this, Drill and Military Science have been declared to be "a part of the studies and exercises in all courses of study and in the requirements of all students in the University."

The Course of Military Instruction and Drill, now prescribed, extends through the first and third terms of the first, second, and third years in the University, and the second term of the fourth year.

These exercises occur not more than three times a week during the first three years, and do not exceed one hour at a time. During the second term of the fourth year they occur but twice a week, and consist mostly of recitations and lectures in reference to the organization and command of a company and battalion.

The Trustees have authorized and instructed the Faculty to make such arrangements that any student may, *after his first year in the University*, substitute other studies and exercises for the Drill and Military Science thus generally required of him.

Under this resolution the Faculty have decided that two recitations a week, or their equivalent in lectures, laboratory work, or other special work in any of the technical courses, for the students of those courses respectively, shall be regarded as an equivalent for the Drill and Military Science for the terms during which they are due.

In order that any student may avail himself of this permission to substitute something else for the Drill and Military Exercises, it will be necessary that, at the time of obtaining his registration ticket for the term, he shall signify to the Registrar what he intends to offer as a substitute. If he neglects to do so he will be holden to the performance of his military duties for the term.

All students that take Drill must continue it through the term. They are required to provide themselves with the University uniform for drill and parade. They are held to a strict accountability for the proper use and care of the arms and other public property issued to them; and in case of neglect, injury or loss, are liable to make payment for the value of the articles; and for wanton injury, to such other penalties as the Faculty may prescribe.

The object of the Drill and Military Instruction is not merely that knowledge of tactics and military evolutions that is required of the practical soldier. The practical military exercises are so ordered as to subserve the purposes of physical culture—an object of vital moment during the critical period of life usually comprised within university years. The fifteen recitations per week required of them are of such a character that most students find it as much as they can well do to prepare themselves for, and attend to them, while the Drill, requiring no extra study, will be no more than the amount of mere physical exercise which each student will find it necessary to take in some form or other.

The Military Exercises include:—(1.) *Infantry Tactics.*—To comprise the schools of the soldier, company and battalion; with skirmishing, the forms of parade, and the duties of guards. (2.) *Artillery Tactics.*—To comprise at least the school of the piece for the field guns, with such further artillery instruction as may be found practicable. (3.) *Special Exercises.*—To comprise recitations at such times as may be prescribed by the professor and approved by the Faculty.

Any student who has satisfactorily performed all the duties thus required of him for the first three years, and who is qualified therefor, will be entitled to a commission, and for the performance of his duties as a commissioned officer during his fourth year he will be entitled to a credit of five recitations per week for one term, and, at his graduation, will receive, moreover, a certificate of military proficiency together with his appropriate Diploma.

Military Science.—The advanced course of instruction is left optional with students, and is open to undergraduates in any of the Courses and to such special students as may have sufficient scientific and practical preparation to pursue it profitably.

The course of instruction requires, from those who pursue it, an attendance upon a class exercise or lecture of one hour's duration, on three days of the week during one academic year, and comprehends the following subjects:—(1.) *Military Engineering.*—To comprise the principles of military topography; the effect of projectiles; the principles of fortification with their application to field

works; military mining; the attack and defense of works, and military roads and bridges. (2.) *The Art of War.*—To comprise the history and principles of special tactics; the organization of armies, with some account of the administrative arrangements of our own army; strategy; grand tactics; and accessory operations of war. (3.) *Military Law.*—To comprise the origin, principles and limitations of military law; the nature and force of the articles of war and the general regulations for the army; a summary of the rules of evidence; the constitution, jurisdiction and procedure of courts martial, courts of inquiry, military commissions and military boards.

X. NATURAL HISTORY.

The studies in this Department are arranged with special reference to the needs of those intending to become naturalists or physicians. It is thought that even a partial course, covering less than four years, will afford the student such preliminary scientific knowledge and training as will enable him to profit more by the special instruction given in the medical schools than he could otherwise do.

I. SCHOOL OF BOTANY.

The full course of instruction in this School, including horticulture, extends through six terms, or two years, commencing with the third or spring term of the University year. It embraces the subjects exhibited in the following schedule:—

(I) *Spring Term.*—Twenty lectures on physiological botany, with laboratory practice (3). (II) *Fall Term.*—Thirty-six lectures on systematic and applied botany (3); laboratory practice (2). (III) *Winter Term.*—Twenty-four lectures on vegetable physiology (3); laboratory practice with microscope (1).

(IV) *Spring Term.*—Twenty lectures on physiological botany; field practice. (V) *Fall Term.*—Special departments of botany (5). (VI) *Winter Term.*—Fifteen lectures on horticulture and arboriculture; and ten lectures on the diseases of cultivated plants.

Instruction is given for the most part by means of lectures, but laboratory practice is considered to be of indispensable importance. Students are everywhere encouraged to study and observe for themselves, and are instructed in the best methods of such study and observation. The course in physiological botany is so designed as to accommodate those who wish only a general knowledge of the elements of botany, with some acquaintance with the modes of analysis and the determination of species. The students properly belonging to the School then take up the subject of systematic and applied botany, in which the leading natural orders are studied in reference to their botanical characters, so as to exhibit the distinguishing peculiarities of the orders themselves, and the princi-

ples involved in the natural system of classification. The prominent species of each order are also considered, especially those of importance as agricultural, medical, economic, or ornamental plants, or as furnishing products useful in any of the arts. In regard to such plants, brief mention is made of their nativity, history, properties, uses, value, and the preparation which their products first undergo before becoming articles of commerce. In the course on vegetable physiology, the minute and general anatomy of plants, their vegetative and reproductive functions, and the relationships existing between plants and the animal and vegetable kingdoms—briefly alluded to in the first course of lectures—are more fully and carefully considered. In the fourth term, the student attends some of the general lectures on physiological botany, if deemed best, but devotes most of his time to laboratory or field practice. The fifth term is devoted to students wishing to make a special study of some particular branch of botany.

The courses of the last term, completing the second year, are intended more particularly for students in agriculture, but are closely related to some of the more useful and interesting departments of botany.

In the botanical laboratory, instruction is given in the analysis of plants and the determination of species; in their minute anatomy, with the aid of the microscope, and the preparation of microscopic specimens; and for more advanced students, instruction is given in the examination of living and dried specimens of plants of which written scientific descriptions are required.

In field practice, besides a general examination of the local flora, the student makes a special study of the flora of some assigned locality.

2. SCHOOL OF GEOLOGY AND PALÆONTOLOGY.

In this school a full course may be completed in the last six terms of the course in Natural History; but as this is designed especially for those intending to become professional geologists, ample provision has also been made for the needs of others by the establishment of shorter courses, both special and general.

The instruction given may be classified under three heads:

I. *Geology proper.*—Comprises the principles of general and theoretical geology, including physiography, geognosy, dynamical geology, stratigraphy and archæology. These subjects are taught by means of (1) a course of lectures in the spring term; (2) laboratory practice, consisting in the critical examination of rocks, the study and construction of geological maps, sections, models, etc., and the preparation of short theses upon special topics; (3) field practice, including also the methods of procedure in geological surveys and reconnoissances.

II. *Palæontology.*—In this department, a course of lectures on palæo-zoology is given to special students, in connection with

the study of fossils in the laboratory. Palæo-botany is also taught in a similar manner, the whole being supplemented by the thorough study of historical geology. Field work is required of all students, as in the other branches of the school.

III. *Economic Geology.*—Comprises the distribution and modes of occurrence of mineral deposits; the geological positions and relations of building stones, fictile materials, fossil fuels, light-producers, pigments and other natural accumulations applicable in the arts, as well as the relations of practical geology to agriculture, architecture, civil and mining engineering, sanitary science, etc. These topics are included in a course of lectures given in the winter term, and in the laboratory, special facilities are afforded for further progress to such persons as may desire it. In this way, engineers, architects, physicians and agriculturists may obtain a knowledge of the subject suited to their particular needs.

The lectures are designed to present outline views of the subjects treated, such as will serve as an introduction to higher geological studies, and afford a general idea of the science to those who have not the opportunity of extending their knowledge of it.

In the laboratory, the student is required to investigate for himself, without access to books until he is prepared to use them in the final stages of his studies. Work is systematically laid out by the teacher at each step, and the rate of progress is determined by the ability and faithfulness of the student.

Whenever practicable, extended excursions are made with the classes, and local field work is frequent in suitable weather.

Professor Comstock is now engaged in a geological survey of the hydrographic basin of Cayuga Lake, a district which presents problems of the highest interest in physical geology. Qualified students will assist in this undertaking, receiving full credit for their work.

Courses of study and practice for post-graduate students provide for advanced work in geology or palæontology to any extent that may be desired. The surface geology of this region is remarkable and the rocks of the vicinity are exceedingly rich in fossils of the Devonian age.

3. SCHOOL OF ZOOLOGY.

This School offers the following instruction:—In the Fall Term, (1) A course of sixty lectures on the anatomy and physiology of domestic animals, by Professor Law. (2) A course of thirty-five lectures upon human physiology and hygiene, by Professor Wilder. (3) A course of thirty-five lectures on psychology and æsthetics, by Professor Wilson. In the Winter Term, (1) A course of thirty lectures on general zoology, by Professor Wilder, and (2) A course of ten lectures upon comparative anatomy, by Professor Wilder. (3) A course of fifty lectures upon veterinary medicine

and surgery, by Professor Law. In the Spring Term, (1.) A course of twenty lectures upon comparative anatomy, by Professor Wilder. (2.) A course on economic entomology, by Instructor Comstock. (3.) Lectures on the natural history of man, forming a part of a course in history (see fourth year) by Professor Wilson.

Laboratory practice.—Students intending to become physicians are required to dissect, first, the common animals, then monkeys, and afterward human subjects, when they can be procured. Special attention is given to the animals inhabiting Cayuga Lake and the vicinity of Ithaca. Instruction is given in the methods of collecting, preserving and arranging anatomical and zoological specimens.

Books of Reference.—Students are at liberty to select from the following list of works for reading upon the subjects treated of in the lectures:—Flint's "Physiology of Man;" Marshall's "Physiology, Human and Comparative;" Dalton's "Human Physiology;" Cleland's, Cutter's, Dalton's or Huxley and Youman's "Physiology and Hygiene." In comparative anatomy—Owen, Huxley, Rolleston, H. J. Clark, T. Rymer Jones. In homologies —Wyman ("Symmetry and Homology in Limbs"), Wilder ("Intermembral Homologies.") In zoology—Agassiz ("Essay on Classification," or "Methods of Study in Natural History"), with Tenney ("Manual of Zoology") or Milne-Edwards ("Elements of Zoology"). In economic entomology and ornithology—Packard, Samuels, the New York State Reports, and Riley's Reports on Entomology to the State of Missouri.

Degrees and Certificates.—To a student who has satisfactorily pursued a partial or special course, there will be given a certificate, stating the time he has spent, the studies pursued, and his degree of excellence therein. It will be signed by the President of the University and the Dean of the Faculty. A student who has completed the full course of four years, will be recommended for the degree of BACHELOR OF SCIENCE.

XI. PHILOSOPHY AND LETTERS.

I. SCHOOL OF PHILOSOPHY.

Instruction in Philosophy does not begin until the first term of the third or Junior year. During that term it consists in a study of the physiology of the nervous system in relation to mental phenomena, and the nature and origin of knowledge.

Spring Term.— Logic, including the laws of thought, the formulæ of reasoning, and the various methods of proof and refutation, together with the methods of investigation and the grounds of certainty.

FOURTH YEAR.—*First Term.*—The History of Philosophy, and the progress of knowledge from its beginning in Greece to the

present day, with criticisms on the methods of philosophy and transcendental logic.

Second Term.—Moral philosophy theories or morals and the development of moral sentiments. For the present Moral Philosophy and Political Economy alternate with each other, each subject being treated only once in two years. The Junior and Senior classes are united in their attendance on these lectures.

During the Winter term of the Senior year there is also a course of lectures on the Philosophy of History. And in the third term of that year a course of lectures is delivered on Law and Jurisprudence, including the three branches, Constitutional, International, and Municipal Law.

2. SCHOOL OF LETTERS.

The study of the English language and literature, including the explanation and illustration of the structure, growth and peculiarities of the language, is incorporated into each of the General Courses.

The School embraces two departments, one of Anglo-Saxon and English Literature, and the other of Rhetoric and General Literature.

I. ANGLO-SAXON AND ENGLISH LITERATURE.

This department is under the charge of Professor Corson, and embraces the following schedule of exercises and lectures:—

In the course in Science:—

No instructions are given by the Professor in this department, until the beginning of the third year.

THIRD YEAR.—*First Term.*—Lectures on the English language and literature, from Chaucer to Milton, inclusive. *Second Term.*—Lectures on the English language and literature, from Dryden to Cowper, inclusive. *Third Term.*—Lectures on English and American literature of the nineteenth century. A Syllabus of the course, prepared by the professor, presents to the student the leading points of each lecture, and the order of their treatment, designates the best editions of an author's works, or parts of them, that are generally accessible, and guides the student to such sources, philological, historical, biographical, critical, etc., as enable him to read to the best advantage.

In addition to the above, the course in Literature embraces:—

FIRST YEAR.—*Second Term.*—Anglo-Saxon Grammar, the A.-S. Version of the Gospel according to St. John, and selections from the Homilies of Ælfric. *Third Term.*—Selections from King Alfred's A.-S. Version of the History of Paulus Orosius, and of Boethius De Consolatione Philosophiæ, and selections from the A.-S. Chronicle.

SECOND YEAR.—*First Term.*—Selections from Layamon's Brut or Chronicle of Britain, the Ancren Riwle, and the Ormulum,

Proclamation of King Henry III, and selections from Robert of Gloucester's Chronicle. *Second Term.*—Selections from Dan Michel's Ayenbite of Inwyt, or Remorse of Conscience, The Voiage and Travaile of Sir John Maundeville, Trevisa's Translation of Ralph Higden's Polychronicon, the Vision of William concerning Piers Plowman, Pierce the Ploughmans Crede, and the Wycliffite Versions of the Bible.

THIRD YEAR.—*First Term.*—Chaucer's Prologue to the Canterbury Tales, the Knightes Tale, and the Nonne Prestes Tale, Lectures on the Language and Versification of Chaucer, and selections from Gower's Confessio Amantis. *Second Term.*—Spenser's Faerie Queene, Books I and II, and Hale's Longer English Poems begun. *Third Term.*—Hale's Longer English Poems continued and finished.

FOURTH YEAR.—*First, Second, and Third Terms.*—Lectures on the Language, Versification, and Dramatic Art of Shakespeare, with the critical textual study of selected plays.

II. RHETORIC AND GENERAL LITERATURE.

This department is under the charge of Professor Shackford, and for the first year the instruction embraces the analysis and synthesis of sentences, the principles of composition, and the history and elements of the English language.

During the second year the exercises in writing and composition are continued; the subjects varying with the advance of the student.

The third year is chiefly devoted to the writing of essays and the practical exemplification of the principles of composition; to extemporaneous speaking, the higher principles of style, and the different kinds of discourse.

The fourth year includes lectures on general literature, on oratory and orators, on style, argument and methods of discourse, and the philosophy and history of literature. Rhetoric is considered in its relation to logic and æsthetics, and the higher forms of literature, poetry and oratory.

Throughout the year, original orations are required, together with reading of essays and extemporaneous discussions. The students will also have exercises in lecturing on topics connected with the theory and application of rhetorical principles, the different periods of literature and the leading representative essayists and orators.

The schedule of the first, third, and fourth years is as follows:—

FIRST YEAR.—*First Term.*—English diction, and construction of sentences; analysis and synthesis of the sentence. *Second Term.*—Construction of the paragraph, figurative language, and poetic diction. *Third Term.*—Narrative and descriptive themes; derivation and composition of English words.

SECOND YEAR.—Essays with readings in the class and criticism of composition and style.

THIRD YEAR.—Essays, orations, and literary criticisms, during the three terms.

FOURTH YEAR.—*First Term.*—Lectures on lyric, epic, and dramatic poetry; original essays, orations, and extemporaneous discussions; readings from Shakespeare and Burke. *Second Term.*—Lectures on ancient and modern orators; criticisms, lectures and essays. *Third Term.*—Lectures on masters of English prose; orations, essays, and discussions.

Letters of inquiry for further information in regard to special departments of the University may be addressed to the head of the department concerning which the inquiry is made.

MEANS AND FACILITIES FOR EDUCATION.

I. BUILDINGS.

1. THE SOUTH AND NORTH BUILDINGS.

These two edifices, architecturally alike, are each one hundred and sixty-five feet by fifty, four stories in height, of blue Ithaca stone, with light Medina dressings. Each building is divided by three halls, running from front to rear. The centre halls are devoted to lecture-rooms. The other halls contain rooms for students, each set accommodating two or three persons. In the SOUTH BUILDING, are the offices of the President, the Treasurer, and the Registrar of the University, and the Faculty Room.

In the NORTH BUILDING is the Hall of the University Literary Societies, where the Young Men's Christian Association also hold their meetings. It contains, moreover, fourteen lecture-rooms, one of which will seat three hundred students, and many of them are furnished with benches and desks for the purpose of taking notes.

2. THE MC GRAW BUILDING.

This building, the gift of Mr. John McGraw, of Ithaca, is constructed, like the edifices around it, of dark blue stone, quarried on the University grounds, but with dressings and cornices of Onondaga gray limestone. In its architecture it corresponds to the others. Its length is two hundred feet and its depth sixty—while its tower rises to a height of over one hundred and twenty. It consists of a main edifice and two wings. The main or central portion of the building comprises one hall one hundred feet long, fifty-six wide and nineteen in height; and another above it of the same length and breadth, but over thirty feet high, the latter containing three galleries, with an average height of twelve feet. In this part of the McGraw building are alcoves and galleries for the Library on the lower floor; and in the galleries on the second floor are the various museums of the University. In the north wing is the anatomical theatre, with ascending seats. Beneath

this are the rooms at present occupied by the Department of Architecture. In the south wing is the Physical lecture-room, and immediately over it the Geological Laboratory. In the campanile, in the centre of the front of the McGraw building—a massive stone tower twenty-two feet square—are placed the Great Bell of the University, the nine smaller bells of the McGraw chimes and the great University clock. The interior of the McGraw building is solidly finished with native woods. Its different parts are separated by walls of brick and doors of iron, rendering them completely fire-proof. The exterior is wholly of stone and iron. The Library Hall contains shelving for eighty thousand volumes. The galleries of the Museum Hall are fifteen feet deep, with a total length of six hundred feet.

3. THE LABORATORY BUILDING.

This wooden building, with a front of one hundred feet, is occupied temporarily by two of the largest scientific departments of the University. Here are the three chemical laboratories, with other accessory rooms, and the draughting-room and the lecture-room of the Department of Civil Engineering.

4. THE SIBLEY COLLEGE.

The sum requisite for the erection of this edifice was the gift of one of the Trustees, the Honorable Hiram Sibley of Rochester. The foundations were laid in the autumn of 1870, and the building was completed during the summer of 1871. It is of stone, and of the same general character as the other University structures. On the first floor are the machine shop and the office of the University Press. On the second floor are the lecture-rooms of the professor of Industrial Mechanics, and the Mechanical Museums. On the third floor are the mechanical and free-hand draughting-rooms. On the north side of the building is an engine-room and a stereotype foundry. The Sibley College was formally opened on Wednesday, June twenty-first, 1871, by the Governor of the State and the authorities of the University.

5. THE SAGE COLLEGE FOR WOMEN.

This is the gift of Honorable Henry W. Sage. It is not a separate department or school, but merely a home or dormitory for women students. It is quadrangular in form, one hundred and sixty-eight feet front, forty-one feet deep and four stories in height. The north wing is eighty-five feet long, and the south wing one hundred and twelve. It is of brick with stone trimmings. The gymnasium nearly connects the wings in the rear. The rooms for the students are eighteen feet by fourteen, with a low board partition dividing off one part for a sleeping-room. The building will

accommodate about one hundred pupils. Besides the dormitories for the pupils it contains lecture and recitation-rooms, a museum, laboratories for students in botany, with green-houses, forcing-houses, and other necessary facilities for the pursuit of floriculture and ornamental gardening.

6. THE SAGE CHAPEL.

This Chapel, the gift of Honorable Henry W. Sage, is situated about half way between the South University and the Sage College for Women. It is built of brick with stone trimmings. It contains two audience rooms, one of which will seat about five hundred persons; the other is smaller. The two rooms are so connected that they can easily be thrown into one when occasion may require; and in fact they are so used on all occasions when the University Sermons spoken of above—under the head of religious instruction, are delivered.

7. CASCADILLA PLACE.

The building nearest to the town is the Cascadilla Place. It is situated at an elevation of about three hundred feet above the town. The building is of stone, four stories high, and about one hundred and eighty feet by one hundred. It takes its name from Cascadilla Creek, on the bank of which it stands, close by two of the finest cascades on the stream. Stages and expresses to and from the town pass the building several times daily, and a station of one of the railroads leading into Ithaca—the Ithaca and Cortland Railroad, a part of the Utica, Ithaca and Elmira road—is located within about two minutes' walk. Several of the professors and their families and a portion of the students reside here. Cascadilla Place is connected with the main group of University buildings, about half a mile distant, by a foot path and drive, that cross the gorge by an iron bridge eighty feet above the bed of the stream, and enter the University campus on the south side.

II. LABORATORIES.

I. THE ANATOMICAL LABORATORY.

The Anatomical Laboratory is in the second story of the McGraw building, adjoining the Museum and lecture-room. In the laboratory are all of the alcoholic collections. Among these are specimens and dissections of the *fishes of Cayuga Lake;* a series of *embryos*, especially of mammals; a series of *brains* of all classes of vertebrates; Brazilian fishes, reptiles and mammals. A large lot of *amphioxus* has lately been received from Italy, and each special student will be enabled to dissect one or more specimens of this, the lowest known vertebrate animal.

2. THE CHEMICAL LABORATORY.

The Chemical Laboratory comprises a large lecture-room for the class in GENERAL Chemistry, and a smaller one for the class in AGRICULTURAL Chemistry and other special classes, and four laboratories for students, besides private laboratories for professors, and other necessary rooms. One of these laboratory rooms, for beginners, will accommodate one hundred and sixty-eight students; another for special students in chemistry has sixteen tables; another for agricultural chemical students has fourteen places, and another for blow-pipe practice has thirty places. The Laboratory is supplied with gas, running water, the Bunson filtration pumps, and the other means necessary for the successful prosecution of the study of chemistry in its various branches.

3. THE ENTOMOLOGICAL LABORATORY.

The Entomological Laboratory is in the McGraw Building and on the same floor as the Anatomical Laboratory. In it is the collection in Entomology, and the work in this Laboratory is under the guidance of a special instructor. Among its collections are a series illustrating the entire life-history of injurious insects, their transformation, food, parasites, etc.

4. THE GEOLOGICAL LABORATORY.

The Geological Laboratory is in the south wing of the McGraw Building, second story, adjacent to the Geological Museum. It is furnished with tables and means for laboratory work, a very complete collection of specimens and books for reference; there are also a large number of photographs, illustrating geological phenomena, from the Hayden expedition and the Pacific Coast surveys, and other sources.

5. THE MECHANICAL LABORATORY.

The Mechanical Laboratory, in the west end of the Sibley College, is carried on for the sole purpose of giving instruction in practical work. It is supplied with lathes, planers and grinding machinery, drilling machine, shaping machine, a universal milling machine fitted for cutting plane, bevel and spiral gears—spiral cutters—twist drills, with additional tools and attachments for graduating scales and circles for working various forms and shapes. In addition to the hand and lathe tools of the usual kind and of the best quality, there are tools of the greatest accuracy—consisting of surface plates, straight-edges and squares of various sizes, a standard measuring machine, measuring from zero to twelve inches by the ten-thousandth of an inch, and a grinding

machine in process of construction for producing true cylindrical and conical forms. These tools are for the purpose of manufacturing standard guages in addition to their general use in the shop.

The machinery is driven by water power through the agency of "wire rope transmission," or by a steam-engine in case of accident to the water power.

6. PHYSICAL LABORATORY.

The rooms at present available for Physical manipulation are somewhat scattered, but good practical provision for this work has been made. The Physical lecture and apparatus-rooms are used during the afternoon by students who wish to acquire skill in the performance of illustrative experiments. Several rooms in the South Building have been provided with the conveniences necessary for experimenting upon the mechanical powers, strength of materials, elasticity of gases, flow of gases and liquids, the solar spectrum, polarized light, and photometry. In the Chemical Laboratory Building, a room has been fitted up with apparatus and conveniences for instruction in practical photography, and for the making of photographic transparencies, or lantern-slides, for scientific illustration. Several thousand of these have been made for the use of the various departments in the University, and duplicates can be furnished to other institutions.

The physical apparatus includes a Deleuil air-pump, lanterns by Dubosoq of Paris, and Wale & Co. of the Stevens Institute, a collection of optical apparatus by Kœnig, a large induction coil by Rhumkorff, a telegraph line more than three miles in length, upon which tests for insulation and resistance and for the location of faults may be made, galvanic batteries of various forms, a large electro-magnet and a Gramme electro-magnetic machine, made at the University work-shop.

This apparatus is all used in connection with the lectures before the classes in physics, as well as by the students pursuing the special course in physical manipulation.

7. THE DRAUGHTING ROOMS.

There are four Draughting Rooms, fitted up with tables, models, and whatever is needed for the work to be done in them. (1.) The Architectural Draughting Room, in the north wing of the McGraw Building, under the direction of Professor Babcock. (2.) The Engineering Draughting Room, in the north wing of the Chemical Building, under the direction of Professor Fuertes. (3.) The Mechanical Draughting Room, in the Sibley College, under the direction of Professor Morris. (4.) The Free-hand Drawing Room, occupying the third story of the Sibley College, under the direction of Assistant Professor Cleaves.

8. THE GENERAL FARM.

The University farm consists of about 100 acres, exclusive of the experimental farm, the campus, and timber land. A large proportion of this is devoted to the raising of food for the domestic animals. In addition to the animals kept for labor and the production of milk, are a few specimens of the leading breeds of cattle, sheep, and swine, the primary object of which, is class illustration. The object of the system pursued consists in raising to the highest standard the condition of the soil and its productive power. But it is evident that this can be accomplished only by a well defined system of rotation, and years of careful and judicious management.

It is further evident that the high price of labor and of fertilizers are the principal obstacles to be overcome in advanced agriculture. By the more extended use of labor-saving implements and the horse in the operations now so often performed by hand, supplemented by the liberal application of fertilizers and clover, we are sanguine that it may be conducted within the limits of economical labor. The general farm is made supplementary to the experimental, by duplicating the experiments of the latter but on a larger scale.

The statistics of the general farm as well as the experiments are kept upon a regular system—the same as that taught in the Agricultural class-room—and will be so arranged that at the close of each year not only the profit or loss upon the whole farm, but that upon each crop or field, can be accurately ascertained.

The old barns near the University buildings have been repaired and adapted to general farm purposes. Near by is a neat and commodious tool-room, organized and arranged after the most approved pattern, in which are stored for the use of the farm and ilustration the best tools of their kind that the market affords.

9. THE EXPERIMENTAL FARM.

Forty acres of the general farm are used in conducting experiments in the rotation of crops, the various modes of cultivation, the value and application of domestic and imported fertilizers, the hardiness, productiveness, and value of the various grains and grasses, and in originating and testing new varieties. To aid in conducting these experiments, a new and commodious barn has been erected, and adapted for that purpose; it will aid for experimentation in feeding domestic animals. It is located near the centre of the farm and comprises three floors, two of which are accessible to teams from the hill-side on which it is erected. In the basement are the manure cellar, engine and horse implement room. The middle story, ten feet high and covering nearly five thousand square feet, is divided into box-feeding stalls, sheep pen,

horse and cow stalls, calf pens, and rooms for hand implements, feed bins and chaff cutter, and, in the hill-side, a capacious root cellar. The barn will be provided with an ample supply of cistern and spring water, with steam power and every facility needed for carrying out the experiment on high farming described above, as well as any other series of experiments that it may be deemed advisable to undertake.

III. THE UNIVERSITY PRESS.

The University Press was founded in 1869 by the gift of a cylinder printing press from the firm of Hoe Brothers, of New York, and a large amount of printing material from the firm of George Bruce's Son & Co., of the same city. Since that period two additional presses and much other printing material have been purchased, so that the University now possesses a complete printing establishment capable of executing any kind of work and in various languages. From it have been issued the UNIVERSITY REGISTER, text-books for the Institution, a Portuguese journal published by the Brazilian students, and a large number of pamphlets. The University Press is amply provided for both job and book work, and occupies a room expressly designed for its accommodation, in the Sibley College.

Besides being a means of partial self-support to experienced printers, it is to be hereafter a means of education for those students who design to make Journalism their business in life, and who, for that reason, need knowledge that can be acquired only by work in the printing office.

The facilities of the printing office have been increased by the addition of a stereotype foundry, by means of which, it is hoped, many more students, who are already conversant with the art of type-setting, will be provided with work and the means of further instruction.

IV. THE UNIVERSITY LIBRARY.

The University Library contains about forty thousand volumes. It is made up of the following named collections:—(1.) A selection of about five thousand volumes purchased in Europe, in 1868, embracing the more recent and valuable works illustrative of the subjects of agriculture, the mechanic arts, chemistry, engineering, the natural sciences, physiology and veterinary surgery. (2.) The collection of works, numbering about four thousand volumes, in history, English, French, German, and Italian literature, forming a portion of the PRESIDENT'S LIBRARY, deposited for the use of the Faculty and students. (3.) THE ANTHON LIBRARY, of nearly seven thousand volumes,—consisting of the collection made by the late Professor Charles Anthon, of Columbia College,—in the ancient languages and literature, besides a great number of valuable works in history and general literature. (4.) THE BOPP LIBRA-

RY—about twenty-five hundred volumes—being the collection of the celebrated Franz Bopp, of the University of Berlin, relating almost wholly to Oriental languages, Oriental literature, and general comparative philology. (5.) THE GOLDWIN SMITH LIBRARY—thirty-five hundred volumes—presented in 1869 to the University by Professor Goldwin Smith, comprising chiefly historical works and editions of the English and ancient classics, which, during later years has been largely increased by the continued liberality of the donor. (6.) The publications of the Patent Office of Great Britain—about three thousand volumes—of great importance for the student of technology and for scientific investigators in general. (7.) THE WHITE ARCHITECTURAL LIBRARY, a collection of over one thousand volumes, many of them very important works, relating to the science of architecture and kindred branches, presented to the Institution by President White; accompanying the gift there was also the sum of fifteen hundred dollars for its increase. (8.) THE KELLY MATHEMATICAL LIBRARY, comprising eighteen hundred volumes and seven hundred tracts, bestowed upon the University by the late Honorable William Kelley, of Rhinebeck. (9.) THE CORNELL AGRICULTURAL LIBRARY, bought by the Honorable Ezra Cornell, chiefly in 1868. (10.) THE SPARKS LIBRARY, being the Library of the late Jared Sparks, the eminent historian, and President of Harvard University, consisting of upwards of five thousand volumes and four thousand pamphlets, relating chiefly to the history of America, which was purchased in January, 1872. There are, besides, some smaller special collections of interest, such as the MAY collection on the history of slavery and anti-slavery, the nucleus of which was formed by the gift of the library of the late Reverend Samuel J. May, of Syracuse; and a collection of American newspapers.

The Library is arranged in departments upon a system of classification based upon that of Brunet, and a slip catalogue of the whole collection is in a state of progress. Separate alphabetical catalogues, with analytical indexes of each department will be issued as early as possible; the first one—Architecture—is now printed and it will be soon followed by the second of the series, embracing Mathematics.

V. THE READING ROOM.

The Library is open and accessible to all registered students every week day from 8 a. m. to 5 p. m. Connected with it is a Reading-Room, containing the following general, critical and scientific periodicals, sets of some of which from the beginning are to be found in the Library, in addition to a few American magazines not here enumerated:—

American.—American Journal of Science; Atlantic Monthly, Canadian Monthly; Country Gentleman; The Nation; Monthly Report of the Department of Agriculture; New York Medical Jour-

nal; North American Review; Harper's Magazine; Historical Magazine; Horticulturist; Journal of the Franklin Institute; Official Gazette of the Patent Office; Prairie Farmer; Railroad Gazette; Railway Review; Specifications of Patents; American Bibliopolist; Cornell Review; Journal of the Telegraph; Journal of Social Science; Medical Eclectic; Penn Monthly; Popular Science Monthly; Publisher's Weekly; Unitarian Review.

English.—Academy; Anthropological Review; Athenæum; Blackwood's Magazine; Bookseller; Builder; Chemical News; Edinburgh Review; Engineer; Examiner; Frazer's Magazine; Guardian; Illustrated News; Journal of the Geological Society; Journal of Microscopical Science; Journal of the Royal Agricultural Society; Mechanics' Magazine; North British Review; Notes and Queries; Pharmaceutical Journal; Philological Society's Proceedings; Popular Science Review; Quarterly Journal of Science; Quarterly Review; Saturday Review; Spectator; Veterinarian; Westminster Review.

French.—Annales de Chimie; Annales des Mines: Annales des Ponts and Chausées; Bibliographie de la France; Bulletin du Bibliophile; Bulletin de la Société chimique; Comtes Rendus; Illustration; Journal de l'Agriculture; Journal de l'Anatomie; Journal de Mathématique; Journal de Menuisérie; Nouvelles Annales de Mathématique; Recueil de Médecine Vétérinaire; Revue des deux Mondes; Revue de l'Architecture; Revue politique et littéraire; Revue scientifique; Revue de Zoölogie.

German.—Annalen der Chemie und Pharmacie; Annalen der Physik; Archäologische Zeitung; Archiv für Anatomie; Archiv für das Studium der neuren Sprachen; Chemisches Centralblatt; Fortschritt der Physik; Hermes; Historische Zeitschrift; Illustrirte Zeitung; Im neuen Reich; Archiv für mikroskopische Anatomie; Archiv für pathologische Anatomie; Bauzeitung; Beiträge für Sprachforschung; Bericht der deutschen Chemischen Gesellschaft; Literarischer Wochenbericht; Milch Zeitung; Palæontographica; Petermann's Mittheilungen; Philologus; Polytechnisches Journal; Jahrbuch für wissenschaftliche Botanik; Jahresbericht für Chemie; Journal für praktische Chemie; Journal für Mathematik; Landwirthschaftliche Versuchs-Stationen; Landwirthschaftliches Centralblatt; Literarisches Centralblatt; Repertorium der Thierheilkunde; Repertorium für Experimental Physik; Rheinisches Museum; Zeitschrift der morgenländischen Gesellschaft; Zeitschrift für analytische Chemie; Zeitschrift für bildende Kunst; Zeitschrift für Sprachforschung; Germania vierteljahrsschrift für deutsche Alterthumskunde; Jahrbuch für Romanische und Englishe Sprache und Literatur; Jahresbericht über die Fortschritte der classischen Alterthumswissenschaft; Journal für die reine und angewandte Mathematik; Mittheilungen über wichtige neue Erforchungen; Zeitschrift für Bauwesen; Zeitschrift für Volkerpsychologie.

VI. MUSEUMS.

1. AGRICULTURE.

The Museum contains (1) THE RAU MODELS, being one hundred and eighty-seven models of plows made at the Royal Agricultural College of Würtemberg, under the direction of Professor Rau, and arranged and classified by him for the Paris Exposition of 1867; (2) Engravings and photographs of cultivated plants and animals obtained at the various agricultural colleges of Europe; (3) THE AUZOUX VETERINARY MODELS, being the entire series used at the government veterinary colleges of France and Russia; (4) A collection of the CEREALS OF GREAT BRITAIN, being a duplicate of that in the Royal Museum of Science and Art at Edinburgh, presented by the British Government; (5) A collection of Agricultural seeds.

The class-room has been provided with a special set of diagrams and other appliances designed to illustrate the subjects of the lectures on agriculture.

2. ARCHITECTURE.

A beginning has been made for a collection designed to illustrate the subjects in this department, consisting of (1) The collection of models in plaster, made by the Frères Chrétien, of Paris, of domes, vaults, arches and stairs; (2) Models, in wood, of roof-trusses, jointing and scarfing; (3) Samples of encaustic tiles, presented by the agents of Minton and Co.; (4) A collection of marbles, American and foreign; (5) A collection of building stones; (6) A large number of lantern-slides to be used in the camera as illustrating various remarkable buildings and the various styles of architecture.

The architectural department in the University Library is particularly full and valuable, containing besides much else, President White's extensive collection of the rarest and most valuable works.

3. BOTANY.

The collections illustrative of botany and horticulture include the following:—THE BOTANICAL MODEL COLLECTION, being a series of thirty *Modèles Clastiques* of plants, on a magnified scale, by Auzoux, of Paris, and plant models designed and executed by Brendel, of Breslau; (2) The HERBARIUM, including the Horace Mann Herbarium, containing several thousand specimens, especially of Sandwich Island plants, purchased by President White and presented to the University, and an extensive collection of indigenous plants, together with small collections of Brazilian, West Indian and European plants; (3) A considerable collection of woods, fruits, dry and alcoholic specimens, collected in Brazil

by Professors Prentiss and Hartt and Mr. Derby; (4) The twenty-six roll maps of Achille Comte of Paris, and the nine botanical charts by Professor Henslow of Edinburgh; (5) A small collection of economic vegetable products.

4. GEOLOGY AND PALÆONTOLOGY.

This Museum comprises:—(1) The JEWETT COLLECTION, embracing a large number of species of fossils, mainly from the New York formations, many of which are illustrated by type-specimens figured and described in the reports of the New York State Geological Survey; (2) A series of rocks and fossils of the Devonian Age to illustrate the geology of Ithaca and vicinity; (3) The HARTT COLLECTION (deposited) of rocks and fossils from the British Provinces and Brazil; (4) The collections of rocks and fossils made by Professor Hartt and his parties on the two Morgan expeditions to the Amazonas in 1870 and 1871; (5) The WARD COLLECTION of casts of fossils, presented by Mr. Cornell; (6) Several miscellaneous collections of ores, rocks and fossils obtained through gift, purchase or exchange; (7) A collection of Indian antiquities made by Professor Hartt, Mr. Derby and Mr. Barnard on the Amazonas in 1870 and 1871; (8) A number of skeletons from the Anglo-Saxon Cemetery at Frilford, England, with a variety of ethnological relics from the same place, the whole presented by Professor George Rolleston, of the University of Oxford; (9) A valuable collection of ancient Peruvian pottery, presented to the Museum by President White; (10) The T. B. COMSTOCK COLLECTION (deposited), of rocks, fossils and minerals, including a quantity of hot spring and geyser deposits from the Yellowstone National Park, with volcanic rocks and other material collected by Professor Comstock, while acting as the geologist of the N. W. Wyoming expedition, in 1873; (11) The SIMONDS COLLECTION (deposited), made up of fossils from the Cayuga Lake Basin, especially from the Hamilton and Chemung groups, and containing many forms as yet undescribed; (12) Several hundred lantern-slides to illustrate the lectures on geology, palæontology and archæology; (13) A number of large photographs illustrating the geology, etc., of the Rocky Mountains and the Pacific Coast, taken on the Hayden Survey and the U. S. Coast Survey; (14) The W. A. JONES COLLECTION (deposited), comprising a choice selection of fossils and minerals from N. W. Wyoming and elsewhere, collected by Captain Jones of the U. S. Engineer corps.

5. MINERALOGY.

The SILLIMAN COLLECTION of minerals, formerly the private collection of the late Benjamin Silliman, is located in the main hall of the McGraw building and contains many valuable specimens. There is also a small but constantly increasing working collection

of minerals situated in the Chemical Laboratory which is used more especially by the students in determinative mineralogy and blow-pipe analysis.

6. MILITARY SCIENCE.

Materials for illustrating the condition of the Military Art at the present time, as well as a collection of curious things pertaining to the department, is being made and will comprise arms of various patterns, shot, shell, and the various kinds of ammunition in use in the army of the United States. It is believed that the student being familiarized with the different articles and their nomenclature, will be enabled to comprehend much better the technical statements of military history; and if his services are required by the national government this information will be of advantage.

7. TECHNOLOGY.

Besides the models made at the University, the Museum of Technology and Civil Engineering comprises:—(1) A collection of working models in brass and iron, illustrative of mechanical principles applied to machinery, and an extended series of photographs for the same purpose, from the establishment of Schröder, of Darmstadt; (2) Another collection of working models in wood and iron, illustrative of intricate mechanical combinations and expedients, made under the direction of Professor Willis, of Cambridge, England, and Professor Rigg, of the College of Mechanics, at Chester; (3) Models illustrative of descriptive geometry, and bridge and roof construction, made by Schröder; (4) The diagrams and charts issued with the sanction of the English Committee of Council on Education; (5) Photographs and models from various sources; (6) A collection of engineering instruments.

8. ZOOLOGY AND PHYSIOLOGY.

The collections in the Museum of Zoology, which are available for the educational purposes of the University, are made up of the following:—(1) THE GREENE SMITH ORNITHOLOGICAL CABINET, a mounted and classified collection of 362 birds, principally American, made and presented to the University by Mr. Greene Smith, of Geneva; (2) THE NEWCOMB CONCHOLOGICAL COLLECTION, including about twenty-five thousand species; (3) The *Modèles Clastiques* of Dr. Auzoux, of Paris, illustrative of comparative anatomy and physiology; (4) The lithographic charts and diagrams edited by Achille Comte of Paris, and those published under the auspices of the Council of Education at London; (5) A constantly increasing collection of native animals in alcohol, and of preparations illustrating their structure; (6) A collection of insects to which additions are constantly made, specially intended

to illustrate the habits of species injurious to vegetation; (7) Various anatomical and zoological specimens deposited by Professors Wilder and Hartt.

VII. COLLECTIONS IN THE FINE ARTS.

Beginnings of a Museum in this department have been made by the following acquisitions: (1) A number of large portraits, busts and medallions of persons connected with the History of the University; (2) A number of bronze copies of masterpieces of statuary, by Barbedienne and others; (3) A collection of over 1500 large photographs, illustrating the architecture and sculpture of the principal ancient and modern nations and periods of art; (4) A considerable collection of casts, illustrating the History of Art, from the establishment of Brucciani in London, from the *Moulage* of the Louvre, and from the Modeling Establishment connected with the Museum of Berlin; (5) A large number of engravings illustrative of Christian Art and of the History of Art in general, including a very full set of the publications of the Arundel Society illustrative of Early Christian Art, a full set of Piranesi, the Heliotype reproductions of the Gray Collection, etc.; (6) A collection embracing about 700 specimens of Medallion Casts, from the Stosch and other German collections, made by Eichler of Berlin; (7) A collection of drawings and casts made under the direction of the South Kensington Museum and the Academies of Fine Arts in Paris and Berlin, and similar Institutions, arranged for the use of students in Free Hand Drawing, especially with reference to the needs of the department of Architecture; (8) A large collection of proofs and other engravings illustrative of recent art, especially of the German and French schools.

VIII. UNDERGRADUATE SOCIETIES.

Besides the instruction given to the students directly by the professors, the students have organized several societies for the promotion of religion, literature, science, and the practical arts. Rooms are set apart for their use in the University Buildings, and the University gladly affords such facilities as are within its power for the furtherance of the objects of these societies.

ADMISSION AND GRADUATION.

ENTRANCE EXAMINATIONS.

Candidates for admission must be of good moral character and at least sixteen years of age, and if women, seventeen.

1. All students, unless provided with Certificates and Diplomas as specified below, must pass Entrance Examinations in: (1) Geography, political and physical. (2) English Grammar, including Orthography and Syntax. (3) Arithmetic, including the metric system. (4) Physiology. (5) Plane Geometry, and (6) Algebra through Quadratic Equations, including Radicals.

Applicants passing these examinations will be admitted as students in the Courses in Agriculture, Architecture, Civil Engineering and Mechanic Arts, or as Optional students.

For these examinations Certificates or Diplomas will be accepted as follows:

(*a*) Regents' *Certificates* issued by the Regents of the State of New York will be accepted instead of entrance examinations in Arithmetic, Geography, and English Grammar.

(*b*) Certificates issued by the Superintendent of Public Instruction of the State of New York, Diplomas issued by the State Normal Schools, and by the Academies and High Schools of the State of New York whose requirements for graduation are approved by the Faculty and whose course of study requires Physiology and Plane Geometry, will be accepted instead of an entrance examination in all the subjects named above except Algebra.

(*c*) Diplomas issued by the Regents to graduates from the High Schools and Academies of the State of New York will be accepted instead of examinations in all the six subjects named above.

2. For admission to any of the other Courses other examinations will be required as follows:

1. For the Courses in Science, Science and Letters, Mathematics, and Chemistry and Physics, either in (1) the principles of French Grammar, the translation of English into French, and of three books of Voltaire's Charles XII, or its equivalent; or (2) the principles of German Grammar, the translation of English into German (Whitney's or Comfort's German Grammar preferred,)

and seventy-five pages of Whitney's Reader or its equivalent; or (3) Algebra entire (*any of the larger ones*), Solid Geometry, including Conic Sections, and Trigonometry, Plane and Spherical.

2. For the Course in Natural History, candidates will be examined in French or German as above; in Plane Trigonometry; four books of Cæsar's Commentaries or some equivalent, with an adequate amount of grammatical knowledge; and in Greek, the alphabet and enough of the language to enable the student to recognize, analyze, and form scientific technical terms.

3. For the Course in Literature and that in Philosophy, in French, German, or advanced Mathematics as above; and in Latin Grammar, including prosody; Composition (Arnold's first twelve chapters); four books of Cæsar or Sallust's Catiline, eight orations of Cicero, or five orations and the *de Senectute*, Virgil's Eclogues, and six books of the Æneid.

4. For the Course in Arts, or the Classical Course, the examinations will be the same as for Optional Students, and in Latin the same as for the Course in Literature; in Greek, Greek Grammar (Goodwin's); writing Greek, with the Accents; the first one hundred and eleven pages of Goodwin's Greek Reader (or four books of Xenophon's Anabasis); the first three books of the Iliad, omitting the Catalogue of Ships; and the History of Greece.

Students who wish to enter any one of the above named courses that require the French, German, or the extra mathematics, and are not prepared to pass the examination in those subjects, can enter as optional students and make up these deficiencies by reciting with the classes in the University.

5. Special Students will be admitted to the University without examination, to any of the Departments in which either laboratory work or drafting is required, by a vote of the Faculty, on the recommendation of the Professor in charge of the Department. Such students must be at least eighteen years of age, and must have some attainments in the subject they propose to pursue; they must devote at least fifteen hours a week to the work of the Department which they have entered, and must renew their application for admission to the Department at the end of each year.

The Examinations at the University will be held on the days indicated in the Calendar, pp. 7 and 8.

1. On the first day the examinations will be in Arithmetic, 9 a.m.; Geography, 11 a.m.; and English Grammar beginning at 3 p.m.

On the second day, Plane Geometry, 9 a.m., Physiology, 11:30 a.m., and in Algebra beginning at 2.30 p.m.

On the third day, Solid Geometry, including conic sections, 8 a.m., French, German, and Greek, each beginning at 9 a.m., Advanced Algebra, 10.30 a.m., and Latin and Trigonometry, each at 2.30 p.m.

2. Entrance Examinations will also be held in June, 1880, at Chicago, Cleveland and Boston. The Examinations will be the same and on the same days for the second and third days, June

15th and 16th but the examinations assigned for the first day at the University will be held in those places on Thursday, the 17th.

These Examinations will be held as follows:

In Chicago at the Central High School;

In Cleveland at the Board of Education Building, 443 Euclid av.

In Boston at the Chauncey Hall School.

For admission to these Examinations a fee of Five Dollars will be charged to each applicant, which, however, will be credited to him towards his tuition for his first term in the University.

Persons intending to enter any of the Examinations besides those held at the University are requested to give notice of their intention to the Registrar as early as the 10th of June preceding the Examinations.

Candidates who give such notice of their intention will be informed by mail of the result of the Examination as soon as it can be ascertained.

Candidates for examination, whether at the University or at either of the places named above, should be present on the day set and at the hour named for the beginning of the examinations, as each examination is complete by itself, and will not be repeated until the time appointed for the next entrance examination.

In case any student is admitted to the University after the beginning of the first term of the year, he will be required to pass, besides the entrance examinations, an examination in that portion of the studies passed over since the commencement of the year by the classes he proposes to enter. *No optional or other course will be possible* without some advance beyond the mere entrance examination.

DIRECTIONS FOR ADMISSION.

The candidate applying for examination at the University will first apply to the Registrar, at South University Building, and get a permit for examination.

In case he come from another college or university, with the "Dismissal" described below, he will at once, on making out his course of study for the term, and filling out the "Student's Return," receive his registration ticket.

But in all other cases the applicant, if qualified as above stated, will receive a permit for his examinations.

After his examination he will call upon the Registrar to ascertain the result; and if it entitles him to admission, he will fill out a blank, with his name in full, the date and place of his birth, the name and residence of his father or guardian, and such other particulars as may be indicated in the blank. He will then, on making out his course of study for the term, receive a ticket of registration.

No student will be allowed to enter any class without passing all the examinations required, and showing to the professor his registration ticket.

CANDIDATES FROM OTHER COLLEGES.

Candidates for admission, coming from other colleges or universities, must present certificates of honorable dismission *after having passed at least one term's examinations.* The dismissal must certify to both good character and scholarship, or be accompanied by other testimonials to that effect.

Such a dismissal will admit the applicant to the Courses in Agriculture, Architecture, Civil Engineering and Mechanic Arts.

But if the applicant wishes to enter any one of the Courses that requires for admission anything more than the six subjects named on p. 78, as required of all students, he must pass the additional examinations required for admission to that Course.

ADMISSION TO AN ADVANCED STANDING.

Students who come from other colleges, or who have prepared themselves in a part of the studies in any one of our Courses, elsewhere, *are in no case* admitted *at once* to any specific advanced standing, as Sophomore, Junior, or Senior.

The class distinctions indicated by those names, and in most cases strictly observed elsewhere, are not regarded by either the Faculty or the students of the University as any obstacle to recitations and attendance upon lectures with any class which the student is prepared to join. Hence students coming from other colleges can easily select such studies as they may need to prepare themselves for graduation here, without regard to distinctions.

Any student wishing to enter an advanced class in any study must apply to the professor in charge of the department whose class he proposes to enter, and undergo such examinations as he may require.

After having been in the University for a year or more, and having sustained a good character, maintained a high standing in their classes and approved themselves for scholarship, such students may, by a vote of the Faculty, be admitted to some definite standing, such as their scholarship will entitle them to, without examination in the studies pursued elsewhere.

TIME REQUIRED FOR GRADUATION.

No student will be permitted to graduate who has not pursued the studies of his course for four entire years in this University; except those who, having pursued part of the studies of their course before coming here, propose to enter at an advanced standing. But in order to do so they must pass up, before the close of their first year, in all the studies that have been pursued by the class they intend to enter. Any students who, by sickness or absence on leave, have lost a part of their time will be allowed in

some cases to take more than the regular studies of their course by asking permission of the Faculty at the beginning of each term. Otherwise no extra studies will be taken into account in considering the qualifications for graduation.

Students who fail at any examination must take the study over again; those who are conditioned must make up their condition at the first ensuing examination on the same subject, and any professor may exclude from his class any student who, after having had one opportunity to do so, shall have failed to remove his condition.

ADMISSION TO POST-GRADUATE COURSES.

Students of good character and industrious habits are admitted to pursue post-graduate studies in the University, after having taken their Baccalaureate degree in this University, or on presenting their diploma of any equivalent degree elsewhere; they are at liberty to attend any of the lectures, recitations, or other exercises with the undergraduates; they have full use of the Library, Museums, etc., and are expected to take some studies, not included in any undergraduate course, under the direction of some particular professor or special faculty. And if they intend to take any advanced degree, they should announce their intention on entering the University.

REGISTRATION.

A schedule of the lectures and exercises for each term is issued at the beginning of the term.

The day next preceding that on which instruction begins is marked in the calendar as REGISTRATION DAY. All students intending to join any classes in the University during the term ensuing, should procure their tickets on or before the close of that day. And no ticket will be issued to those who have previously been admitted to the University by examinations or otherwise, after that time, except in cases where there were very urgent reasons for the delay, and by special permission of the Faculty.

EXERCISES DURING THE TERM.

The beginning and end of all lectures and recitations are determined by the ringing of the great bell in the McGraw tower. Lectures and class exercises commence at 8 A. M. and continue until 1 P. M. Within these five hours all the University exercises are comprised, except laboratory practice, practical agricultural work, military drills, and some of the lectures of non-resident professors.

TERM EXAMINATIONS.

Examinations in all the classes of the University are held at the end of each term, To insure continuance in the University it is necessary to pass these examinations. But those students who exhibit only a slight deficiency in any particular subject are conditioned in that study, and are required to pass another examination at such time as the professor in whose department the deficiency occurred may require. All conditioned students are expected to attend their classes regularly, as if not conditioned. But a marked deficiency in two or more of the studies at any term examination is deemed sufficient cause for exclusion from the University, or for reduction to a less advanced standing in the course.

Reports of all examinations are made and a record of them is kept by the Registrar. A Course Book also has been provided which the students may procure and in which they may have an entry made, term by term, indicating the grade at which they passed their examination. Any student may ascertain on making application to the Registrar whether he has passed his examinations or not.

The mere passing of the term examinations, however, will not be sufficient for *graduation* in any course. There must be either a general average of scholarship above what is required for continuance in the University, or a marked proficiency in some one of the more general departments of study, And no student who fails to graduate with his class, in consequence of insufficient scholarship, will be allowed to graduate afterwards or with any subsequent class without passing at least one or more terms in the University as a registered student, taking such studies as the Faculty may require. And all Diplomas will be dated from the time when they are granted.

COMMENCEMENT THESES.

Each student is required, before taking any degree, to submit to the Faculty a satisfactory Oration, Poem or Essay, on some subject in Science or Literature, and, in case it is accepted and he is allowed to graduate, he must deposit a copy of his paper in the University Library before graduation.

CONDUCT OF STUDENTS.

The University proposes to treat its students as men rather than as mere boys, assuming no farther control over them than is necessary to secure the accomplishment of the objects for which students resort to it. For this purpose a few general rules have been found necessary. These rules provide, among other things, that every student, unless specially excused by the Faculty, shall attend at least fifteen recitations, or their equivalent in lectures and laboratory

practice, each week, and for the term in which Drill is required, either the Drill or two hours of extra study, and that no student is allowed to take an optional course that is not approved by the Faculty as worthy of his time and efforts.

Any student having occasion to be absent from his duties must obtain a leave of absence from the President or Vice-President; and in case he absents himself from his University duties without leave for more than three consecutive days, he is regarded as having withdrawn from the University, and will not be allowed to return without the consent of the Faculty.

Any student found guilty of intoxication or other gross immorality will be at once dismissed.

And any student who so far neglects his duties as to fail to pass his term examinations satisfactorily, loses his position in the University. He may, at the discretion of the Faculty be allowed to re-enter once again, on probation. But the occurrence of a second failure is regarded as indicative either of incapacity or of a want of application, and will be followed either by exclusion from the University or by restriction to some one of the regular courses.

THE DEGREE OF BACHELOR.

The degree of Bachelor of Science is conferred on all those students who satisfactorily complete any one of the five courses: Science, Science and Letters, Chemistry and Physics, Mathematics, or Natural History. And the particular course pursued by the student is specified in the Diploma.

The degrees of Bachelor of Arts, of Literature, of Philosophy, of Agriculture, of Architecture, of Civil Engineering, and of Mechanical Engineering are given to the students who satisfactorily complete the courses corresponding to the degree named. The degree of Bachelor of Veternary Science is also given to students who complete a full course of four years in that department.

No two degrees will be conferred at the same time.

For any one of the above degrees it is not necessary that the student should pursue the course leading to it in precisely the same order as it is laid down in the statement of courses below. But experience has abundantly confirmed what was in fact obvious at first, that it is best for each student, who expects to graduate at all, to take the course leading to the degree he seeks, and pursue it as laid down in the Register. But very few of those who attempt an optional course succeed in graduating in any course.

In some cases, also, substitutes, or equivalents for the studies named in the respective courses will be accepted; but the substitutes or equivalents must be in the same general department and of a similar kind to those for which they are offered.

A fee of five dollars is charged in all cases for Baccalaureate degrees, which must be paid before the diploma will be given.

ADVANCED DEGREES.

Post-graduate courses of study leading to second or advanced degrees, have been, or will on application, be marked out in the following General Departments: Chemistry and Physics, History and Political Science, Ancient Classical Languages and Literature, Modern European Languages and Literature, Oriental Languages and Literature, Mathematics, Natural History, Comparative Philology, and Philosophy and Letters.

Any student intending to take a second or advanced degree should apply to the Faculty to be admitted a candidate for the degree he wishes to take, and signify the department in which he wishes to prepare himself for the degree.

MASTER'S Degrees in Arts, Literature and Science, will be conferred on those who have taken the Bachelor's degree in this University or elsewhere, where the requirements for those degrees respectively are equal to our own, on the following conditions:

1. After having spent at least one year in this University in a course of post-graduate study marked out by the Faculty in each case, presented a satisfactory thesis and passed a satisfactory examination at the University in the course of study pursued.

2. The same degrees will be conferred without residence on graduates of this University only, on conditions the same in all respects as above, except that the degree will not be given until three years after the Baccalaureate Degree has been taken.

The degree of MASTER OF SCIENCE will be conferred on graduates in the Course in Philosophy on the same conditions as though they had graduated in the Course in Science.

The degree of CIVIL ENGINEER will be conferred (1) on Bachelors of Civil Engineering, after two years of study and practice, on passing the requisite examinations and presentation of a satisfactory thesis; (2), on those who have completed the five years course, at their graduation.

The degree of DOCTOR OF VETERINARY MEDICINE is conferred on those students who have spent two years in additional study, after receiving the degree of Bachelor of Veterinary Science and who shall have passed satisfactory examinations therefor.

The degree of DOCTOR OF PHILOSOPHY will be conferred on graduates of the University, and of other universities and colleges whose requirements for the Bachelor's degree are equal to our own, on the following conditions:

1. In order to become a candidate the applicant must have, over and above what is required here for graduation in the Course in Philosophy, a knowledge of Greek equal to that required here for admission to the Course of Arts.

2. The candidate must spend at least two years at this University in a course of study marked out by the Faculty as leading to this degree.

3. He must pass an examination upon the course marked out and present a meritorious thesis upon some subject included in the course of study.

The degree of DOCTOR OF SCIENCE will be conferred on graduates of this University, and other universities and colleges whose requirements for the Bachelor's degree are equal to our own, on the following conditions:

1. In order to become a candidate the applicant must have

(*a*) A knowledge of Latin and Greek at least equal to that now required for admission here to the Course in Natural History.

(*b*) A knowledge of French and German equal to that required here for graduation in the Course in Science.

(*c*) A knowledge of science, of literature and of philosophy equal to that required here for graduation in the Course in Philosophy.

2. The candidate must spend at least three years, two of them at this University, in the study of not less than two scientific subjects, approved by the Faculty, in one or more of the departments of Chemistry and Physics, Mathematics and Natural History.

3. He must pass an examination upon these subjects, showing in one of them special attainments, and must present a meritorious thesis based on special investigations, or make some other contribution to science.

Every successful candidate for any advanced degree will be required to pay to the Treasurer ten dollars before receiving his diploma.

They will also be required, in the case of the Doctor's degrees, to print their theses and deposit fifty copies in the Library of the University before receiving their diplomas.

In all other cases of second degrees the successful candidate will be required to deposit a copy of his thesis in the University Library.

No student in any post-graduate course will be allowed to take two degrees for the same course, to take any inferior degree for any part of the study that leads to a higher one, or be a candidate for more than one degree at the same time.

Candidates for any second degree are required to make their applications to the Registrar and present their theses at least twenty days before the annual Commencement at which they propose to take their degree.

A committee consisting of four members of the Faculty will superintend the examinations, which will take place during the second week previous to Commencement week.

CERTIFICATE OF LICENTIATE.

LICENTIATE certificates or certificates of proficiency, are conferred upon students who have pursued a special course in any branch of knowledge. They are given upon the recommendation of the respective Faculties.

PAYMENTS TO THE UNIVERSITY.

Free tuition is given:

1. To all State students appointed as described on p. 35.
2. To all resident graduates of this University and graduates of other colleges and universities whose requirements for graduation are equal to our own.
3. In order to encourage the study of Agriculture and the sciences more immediately related to it, the Trustees decided to give free tuition to all students in Agriculture; and in 1877, at the expiration of the first period, they voted to extend the same favor to that class of students for three years more. Under this rule free tuition is given to agricultural students who are pursuing either the three or the four years course and *intending to complete* the course.

For all others the tuition fees are twenty-five dollars a term.

There is also a charge of five dollars as a graduation fee which must be paid by each student before taking any Baccalaureate Diploma, and the same sum for any second degree.

No matriculation or entrance fees are required, nor is any discrimination made between students coming from other States.

The fees for instruction must be paid in advance, at the beginning of each term.

All students are, moreover, held responsible for any injury done by them to the property of the Institution.

Each student intending to take laboratory practice in Chemistry must deposit with the Treasurer security for payment for the materials used by himself in the Laboratory. The amount required for this deposit will vary with the amount of time devoted to the practice.

About fifty students can be accommodated in the University buildings. Such as avail themselves of this provision are required to pay their bills for rooms one month in advance. Fuel and simple furniture are also supplied to students in the University buildings at low prices.

EXPENSES OF RESIDENCE.

The following is an approximate estimate of the yearly expenses:—

Fees for instruction, $25 a term, - - - - - -	$ 75.00
Room, board, lights and fuel, about - - - - -	240.00
Total, - - - - - - ·	$315.00

Cascadilla Place is owned by the University, and is rented to professors and students, each taking one room or more as he may choose. There is a janitor living in the building to take care of it and do such work for the inmates as they may choose to employ him to do.

The Sage College is open as a dormitory and boarding-house

for women students only. The cost for board, room rent, fuel and lights, varies from $5.50 to $7.50 per week. The rooms are all furnished and carpeted. Students occupying one of the most desirable rooms alone, pay $7.50 per week. If two occupy such rooms together, the price is $6.25. Those occupying less desirable rooms, with two in a room, pay $5.50 each per week. The entire building is warmed by steam, and in most rooms the sleeping apartments are separate from the ordinary studying room. Washing will be done in the building at the usual rates of charge for such work.

Other items will vary with the student's disposition and habits. Text-books and stationery cost from $20 to $30 a year.

The expense of living in town, outside of the University buildings, varies, for board, room, fuel and lights, from four to ten dollars a week. In many cases students, by the formation of clubs, have been able to reduce their expenses to sums ranging from two and a half to three and a half dollars a week for board and room rent.

COURSES OF STUDY.

The courses of study are arranged in four classes: (1.) those aiming at general culture; (2) those aiming at special culture in some departments; (3) technical courses or those that are designed to prepare the students for some kind of practical work; (4.) partial courses leading to no degree.

In stating the courses the figures in parentheses ( ) indicate the number of recitations or lectures per week, and studies named in *italics* are optional, and those with an "*or*" between them are equivalents for each other.

In computing Laboratory Practice two hours and a half of actual work are regarded as equal to one recitation.

In Draughting and Shop Work three hours of actual work are required as the equivalent of one recitation.

I. GENERAL COURSES.

1. The Course in Arts.

Leading to the Degree of Bachelor of Arts.

FIRST OR FRESHMAN YEAR.

First Term.—Greek (4); Latin (4); geometry and conic sections (5); rhetoric and composition (2); six lectures on hygiene, beginning the first Tuesday in the term.

Second Term.—Greek (4); Latin (4); algebra (5); rhetoric and composition (2).

Third Term.—Greek (4); Latin (4); trigonometry and mensuration (5); rhetoric and composition (2).

SECOND OR SOPHOMORE YEAR.

First Term.—Greek (4); Latin (4); exercises in rhetoric (1); *physiology, French, German, mathematics, chemistry, experimental mechanics* (6).

Second Term.—Greek (4); Latin (4); exercises in rhetoric (1); *zoology, French, German, mathematics, chemistry, electricity and magnetism.*

Third Term.—Greek (4); Latin (4); exercises in rhetoric (1); *botany, modern languages, mathematics, chemistry, electricity and magnetism* (6).

THIRD OR JUNIOR YEAR.

First Term.—Psychology (2); essays (1); *Greek, Latin, modern languages, English literature, Roman history, mathematics, heat, geology* (12).

Second Term.—Political economy (2); essays (1); *Greek, Latin, modern languages, English literature, mathematics, astronomy, acoustics and optics, history of Roman empire* (12).

Third Term.—Logic (3); essays and criticism (1); *Greek, Latin, modern languages, English literature, mediæval history, mathematics, acoustics and optics* (11).

FOURTH OR SENIOR YEAR.

First Term.—History of philosophy (3); general literature (3); *Greek, Latin, modern languages, pure mathematics, applied mathematics* (10).

Second Term.—Moral philosophy (2); general literature and modern oratory (3); *Greek, Latin, modern languages, special literature, history, pure mathematics, applied mathematics* (10).

Third Term.—Critical analysis of authors and extempore speaking (3); lectures of non-resident professors; *Greek, Latin, history, modern languages, pure mathematics, applied mathematics* (10).

Students electing *physics* are required to continue the study through one complete part of the subject, and those electing *chemistry* are required to continue it through two terms.

During the third year, and the first two terms of the fourth, a student may devote twelve hours a week to the classics with the consent of the classical instructors.

2. THE COURSE IN LITERATURE.

Leading to the Degree of Bachelor of Literature.

FIRST OR FRESHMAN YEAR.

First Term.—Geometry and conic sections (5); Latin (4) physiology (3); rhetoric and composition (2); six lectures on hygiene, beginning on the first Tuesday in the term.

Second Term.—Algebra (5); Latin (4); Anglo-Saxon (4); rhetoric and composition (2).

Third Term.—Trigonometry and mensuration (5); Latin (4); botany (3); Anglo-Saxon (3).

SECOND OR SOPHOMORE YEAR.

First Term.—German (5) and French (3), *or* French (5) and German (3); Anglo-Saxon (3); Latin (4); exercises in rhetoric and composition (1).

Second Term.—German (5) and French (3), *or* French (5) and German (3); early English (3); Latin (4); exercises in rhetoric and composition (1).

Third Term.—German (5) and French (3), *or* French (5) and German (3); Latin (5); early English (2); rhetorical exercises and composition (1).

THIRD OR JUNIOR YEAR.

First Term.—Psychology (2); Roman history (5); Latin, modern languages *or* science (6); essays (1); English literature (2).

Second Term.—Political economy (2); history of the Roman empire (5); Latin, modern languages *or* science (6); essays (1); English literature (2).

Third Term.—Logic (3); mediæval history (5); Latin, modern languages *or* science (6); essays (1); English literature (2).

FOURTH OR SENIOR YEAR.

First Term.—Modern history (3); American history (2); history of philosophy (3); special literature (2); general literature and oratory (3); Latin, modern languages *or* science (4).

Second Term.—American history (2); philosophy of history (3); moral philosophy (2); special literature (2); general literature and oratory (3); Latin, modern languages *or* science (4).

Third Term.—American law (5); special literature (2); general literature and oratory (3); Latin, modern languages *or* science (4); attendance on lectures of non-resident professors and preparation for Commencement.

3. THE COURSE IN PHILOSOPHY.

Leading to the Degree of Bachelor of Philosophy.

FIRST OR FRESHMAN YEAR.

First Term.—Geometry and conic sections (5); Latin (4); French *or* German (5); rhetoric and composition (2); six lectures on hygiene, beginning the first Tuesday in the term.

Second Term.—Algebra (5); Latin (4); French *or* German (5); zoology (3).

Third Term.—Trigonometry (5); Latin (4); French *or* German (5); botany (3).

SECOND OR SOPHOMORE YEAR.

First Term.—German *or* French (3); physiology (3); analytical geometry (5); experimental mechanics (3); chemistry (2).

Second Term.—German *or* French (3); electricity and magnetism (2); chemistry (2); chemical practice (2); rhetorical exercises (1); calculus, science *or* modern languages (5).

Third Term.—German *or* French (3); electricity and magnetism (2); chemical lectures (2); rhetorical exercises (1); calculus, science *or* modern languages (7).

THIRD OR JUNIOR YEAR.

First Term.—Psychology (2); Roman history, science *or* languages (5); chemistry (2); geology (3); heat (3); essays (1); English literature (2).

Second Term.—Political economy (2); history of the Roman empire, science *or* languages (5); descriptive astronomy (3); acoustics and optics (3); essays (1); English literature (2).

Third Term.—Logic (3); mediæval history, science *or* languages (5); physical astronomy (3); acoustics and optics (3); essays (1); English literature (2).

FOURTH OR SENIOR YEAR.

First Term.—Modern history (3); American history (2); history of philosophy (3); general literature and oratory (3); *optional* (5).

Second Term.—American history (2); philosophy of history (3); moral philosophy (2); general literature and oratory (3); *optional* (5).

Third Term.—American law (5); general literature and oratory (3); *optional* (5); attendance on lectures of non-resident professors and preparation for Commencement.

4. The Course in Science and Letters.

Leading to the Degree of Bachelor of Science.

FIRST OR FRESHMAN YEAR.

First Term.—Geometry and conic sections (5); French (5) and German (3), *or* German (5) and French (3); rhetoric and composition (2); six lectures on hygiene, beginning the first Tuesday in the term.

Second Term.—Algebra (5); French (5) and German (3) *or* German (5) and French (3); rhetoric and composition (2).

Third Term.—Trigonometry (5); French (5) and German (3) *or* German (5) and French (3); rhetoric and composition (2).

SECOND OR SOPHOMORE YEAR.

First Term.—French *or* German (3); physiology (3); zoology (2); chemistry (2); rhetorical exercises (1); analytical geometry, science *or* modern languages (4).

Second Term.—French *or* German (3); zoology (3); chemistry (2); rhetorical exercises (1); calculus *or* science and modern languages (6).

Third Term.—French *or* German (3); botany (3); chemistry (2); rhetorical exercises (1); calculus *or* modern languages and science (6).

THIRD OR JUNIOR YEAR.

First Term.—Psychology (2); Roman history (5); geology (3); physics (3); English literature (2); essays (1).

Second Term.—Political economy (2); history of the Roman empire (5); physics (3); descriptive astronomy (3); English literature (2); essays (1).

Third Term.—Logic (3); mediæval history (5); physics (2); physical astronomy (3); English literature (2); essays (1).

FOURTH OR SENIOR YEAR.

First Term.—Modern history (3); American history (2); history of philosophy (2); general literature and oratory (3); *optional* (5).

Second Term.—American history (2); philosophy of history (3); moral philosophy (2); general literature and oratory (3); *optional* (5).

Third Term.—American law and polity (5); general literature and oratory (3); *opitonal* (5).

The hours marked optional may be filled with any science, mathematics, modern languages or literature, for which the student is prepared by previous study.

II. SPECIAL COURSES.

Leading to the Degree of Bachelor of Science.

1. THE COURSE IN SCIENCE.

FIRST OR FRESHMAN YEAR.

First Term.—Geometry and conic sections (5); French (5) and German (3) *or* German (5) and French (3); rhetoric and composition (2); six lectures on hygiene, beginning on the first Tuesday in the term.

Second Term.—Algebra (5); French (5) and German (3) *or* German (5) and French (3); zoology (3).

Third Term.—Trigonometry (3); French (5) and German (3) *or* German (5) and French (3); botany (3).

SECOND OR SOPHOMORE YEAR.

First Term.—French *or* German (3); physiology (3); analytical geometry (5); experimental mechanics (3); chemistry (2).

Second Term.—French *or* German (3); electricity and magnetism (2); chemistry (2); rhetorical exercises (1); calculus, *or* science (7).

Third Term.—French *or* German (3); electricity and magnetism (2); chemical lectures (2); rhetorical exercises (1); calculus, *or* science (7).

THIRD OR JUNIOR YEAR.

First Term.—Heat (3); chemistry (2); geology (3); English literature (2); essays (1); *optional,* six hours, of which at least three must be given to one of the following sciences: *botany chemistry* or *zoology.*

Second Term.—Acoustics and optics (3); geology (3); English literature (2); essays (1); descriptive astronomy (3); *optional,* four hours, which must be given to one of the following sciences: *botany, chemistry* (including *mineralogy*) or *zoology.*

Third Term.—Acoustics and optics (3); descriptive geometry (4); English literature (2) essays (1); physical astronomy (3); *optional,* four hours, which must be given to one of the following sciences: *botany, chemistry, geology,* or *zoology.*

FOURTH OR SENIOR YEAR.

First Term.—Modern history (3); American history (2); *optional,* eleven hours, of which at least eight must be given to two of the following sciences; three or five hours may be devoted to each science taken: *botany, chemistry, geology, mathematics, physics* or *zoology.*

Second Term.—American history (2); political economy (2); *optional,* eleven hours, subject to the same conditions as in the first term of this year, except that chemistry may include mineralogy.

Third Term.—Constitution of the United States, twelve lectures. *Optional,* eleven hours, subject to the same conditions as in the first term of this year.

The optional hours not required for science in the junior and senior years may be given to either scientific, literary, historical or philosophical subjects. In electing their particular lines of study in the sciences of the junior or senior year, students will be required to take at least the minimum amount of each science elected that is given throughout the year.

Students intending to take the physics of the senior year must take the calculus of the sophomore year; those intending to take geology of the senior year must take blow-pipe determination of minerals previous to that year.

2. The Course in Mathematics.

FIRST OR FRESHMAN YEAR.

First Term.—Geometry and conic sections (5); French and German (8); rhetoric and composition (2); six lectures on hygiene, beginning on the first Tuesday in the term.

Second Term.—Algebra (5); French and German (8); rhetoric and composition (2); linear draughting (2).

Third Term.—Trigonometry (5); French and German (8); botany (3); rhetoric and composition (2).

SECOND OR SOPHOMORE YEAR.

First Term.—Analytic geometry (5); experimental mechanics (3); French *or* German (3); exercises in rhetoric (1); free-hand drawing (3).

Second Term.—Analytic geometry of three dimensions (2); modern methods in analytic geometry (3); calculus (3); electricity and magnetism (2); French *or* German (3); exercises in rhetoric (1); free-hand drawing (3).

Third Term.—Calculus continued (5); descriptive geometry (4); electricity and magnetism (2); French *or* German (3); exercises in rhetoric (1).

THIRD OR JUNIOR YEAR.

First Term.—Integral calculus (5); descriptive geometry continued (4); heat (3); physiology (3); essays (1).

Second Term.—Differential equations (3); quaternions (2); acoustics and optics (3); chemistry (3); zoology (3); essays (1).

Third Term.—Differential equations continued and theory of functions (5); acoustics and optics (3); chemistry (3); logic (3); essays (1).

FOURTH OR SENIOR YEAR.

First Term.—Analytic and celestial mechanics (3); mathematical essays (1); astronomy (3); shades, shadows and perspective (3); modern history (3); geology (3); English literature (1).

Second Term.—Philosophy of mathematics, with reviews (5); mathematical essays (1); philosophy of history (3); English literature (1); *optional* (5).

Third Term.—Philosophy of mathematics, with reviews (5); mathematical essays (1); twelve lectures on the Constitution of the United States; English literature (1); *optional* (6.)

For most of those studies in this course which are not closely connected with mathematics, substitutes will be allowed.

3. THE COURSE IN NATURAL HISTORY.

FIRST OR FRESHMAN YEAR.

First Term.—French and German (8); chemistry (2); rhetoric (2); free-hand drawing (3); six lectures on hygiene, beginning on the first Monday in the term.

Second Term.—Modern languages (8); rhetoric (2); chemical lectures (2); chemical laboratory work (3).

Third Term.—Modern languages (8); rhetoric (2); chemical lectures (2); chemical laboratory work (3).

SECOND OR SOPHOMORE YEAR.

First Term.—French *or* German (3); rhetoric (1); lectures on human physiology (3); lectures and laboratory work in anatomy (3); experimental mechanics (3); organic chemistry (2).

Second Term.—French *or* German (3); rhetoric (1); lectures on zoology (3); lecture and laboratory work in physiological anatomy and histology (6); blow-pipe determination of minerals (3).

Third Term.—French *or* German (3); rhetoric (1); general lectures on botany (3); field work in botany (3); lectures on the comparative anatomy of the brain (2); laboratory work in zoology (4).

THIRD OR JUNIOR YEAR.

First Term.—Lectures and laboratory work on vascular cryptogams (3); laboratory and field work on compositæ or special groups (2); lectures on geology (3); psychology (2); heat (3): essays (1); English literature (1).

Second Term.—Lectures on vegetable physiology (3); vegetable histology (2); lectures on advanced and economic geology (3); laboratory work in geognosy (3): electricity and magnetism (2); essays (1); English literature (1).

Third Term.—Lectures and laboratory work on algæ and musci (2); entomology (2); lectures on palæontology (3); laboratory work in palæontology (3); laboratory and field work in entomology (3); electricity and magnetism (2).

FOURTH OR SENIOR YEAR.

First Term.—Lectures and laboratory work on fungi (3); lectures on principles of horticulture (2); astronomy *or* lectures on anatomy and physiology of domestic animals (5); laboratory and field work in geology (5); history of philosophy (3).

Second Term.—Lectures on systematic and applied botany (3); laboratory work on graminæ or special groups (2); (the course in botany for this term alternates with that of the winter term of the

junior year); laboratory work in geology or palæontology (3); advanced work in either botany, geology or zoology (5); acoustics and optics (3).

Third Term.—Advanced work in botany, geology or zoology, or veterinary medicine and surgery (10); acoustics and optics (3).

Students intending to enter medical schools will be allowed to devote to human anatomy and physiology some of the time otherwise given to general zoology.

III. TECHNICAL COURSES.

1. THE COURSE IN AGRICULTURE.

Leading to the Degree of Bachelor of Agriculture.

FIRST OR FRESHMAN YEAR.

First Term.—Geometry and conic sections (5); drawing, free-hand (3); German (5); rhetoric and composition (2); six lectures on hygiene, beginning on the first Tuesday in the term.

Second Term.—Algebra (5); drawing, free-hand (3); German (5); rhetoric and composition (2).

Third Term.—Chemistry, general, practice and lectures (3); German (5); rhetoric and composition (2); trigonometry and mensuration (5).

SECOND OR SOPHOMORE YEAR.

First Term.—Chemistry, agricultural (5); chemical practice, qualitative analysis (2); anatomical practice (2); German (3); experimental mechanics (3).

Second Term.—Chemistry, agricultural (5); chemical practice, qualitative analysis (2); anatomical practice (2); zoology (3); German (3); electricity and magnetism (2).

Third Term.—Botany, lectures (3), field work (2); entomology, lectures (2), practice (2) (4); German (3); land surveying (4).

THIRD OR JUNIOR YEAR.

First Term.—Botany, compositæ and field work *or* practical horticulture (2); entomology (3); agricultural chemistry, quantitative analysis (3); heat (3); veterinary anatomy and physiology (5).

Second Term.—Acoustics and optics (3); botany (vegetable physiology), lectures (3); vegetable histology and laboratory work *or* practical horticulture (2); chemical practice, quantitative analysis (4); veterinary medicine and surgery (5).

Third Term.—Acoustics and optics (3); botany, special field or laboratory work *or* practical floriculture (3); chemical practice, quantitative analysis (5); veterinary medicine and surgery (5).

FOURTH OR SENIOR YEAR.

First Term.—Agriculture, lectures (5); practice (3) (Tuesday and Thursday afternoons); botany (fungi) (3), principles of horticulture (2); geology (3)

Second Term.—Agriculture, lectures (5); practice (2) (Tuesday and Thursday afternoons); botany (systematic and applied, lectures) (3), laboratory work on gramineæ or special groups (2); horticulture (2).

Third Term.—Agriculture, lectures (3); practice (3) (Tuesday and Thursday afternoons); building materials and construction (2); constitutional law (5).

2. THE COURSE IN ARCHITECTURE.

Leading to the Degree of Bachelor of Architecture.

FIRST OR FRESHMAN YEAR.

First Term.—Geometry and conic sections (5); French *or* German (5); rhetoric (2); free-hand drawing (3); linear drawing (1); six lectures on hygiene, beginning on the first Tuesday in the term.

Second Term.—Algebra (5); French *or* German (5); rhetoric (2); free-hand drawing (3); projection and tinting (1).

Third Term.—Trigonometry (5); descriptive geometry (4); French *or* German (5); botany (3).

SECOND OR SOPHOMORE YEAR.

First Term.—Descriptive geometry (4); analytical geometry (5); French *or* German (3); experimental mechanics (3); chemistry (2).

Second Term.—Calculus (5); French *or* German (3); chemistry (2); electricity and magnetism (2); draughting (2); essays (1).

Third Term.—Building materials and construction (3); French *or* German (3); chemistry (2); electricity and magnetism (2); free-hand drawing (3); architectural draughting (2); essays (1).

THIRD OR JUNIOR YEAR.

First Term.—Shades, shadows and perspective (3); mechanics (3); heat (3); lectures on Egyptian, Greek, and Roman architecture (3); lectures on designing and designing (4).

Second Term.—Lithology and determinative mineralogy (2); lectures on Byzantine and Romanesque architecture (5); optics and acoustics (3); mechanics (2); designing (4).

Third Term.—Optics and acoustics (3); lectures on Gothic architecture (3); designing (5).

FOURTH OR SENIOR YEAR.

First Term.—Lectures on renaissance architecture (3); geology (3); designing (6); stereotomy (3).

Second Term.—Stereotomy, applied to stone-cutting (5); lectures on modern architecture (3); advanced and structural geology (3); designing (4).

Third Term.—Lectures on decoration, acoustics, ventilation, warming, professional practice, measuring, contracts, specifications, etc., (3); designing (9); preparation of thesis.

3. THE COURSE IN CHEMISTRY AND PHYSICS.

Leading to the Degree of Bachelor of Science.

FIRST OR FRESHMAN YEAR.

First Term.—Geometry and conic sections (5); French and German (8); rhetoric and composition (2); six lectures on hygiene, beginning on the first Tuesday in the term.

Second Term.—Algebra (5); French and German (8); rhetoric and composition (2).

Third Term.—Trigonometry (5); French and German (8); rhetoric and composition (2).

SECOND OR SOPHOMORE YEAR.

First Term.—Analytical geometry (5); French *or* German (3); experimental mechanics (3); physiology (3); chemical lectures (2).

Second Term.—Chemistry (2); electricity and magnetism (2); French *or* German (3); zoology (3); chemical practice (6).

Third Term.—Chemistry (2); electricity and magnetism (2); French *or* German (3); botany (3); chemical practice (5).

THIRD OR JUNIOR YEAR.

First Term.—Chemical philosophy (3); heat (3); geology (3); chemical practice (7).

Second Term.—Chemical philosophy (3); mineralogy *or* metallurgy (2); organic chemistry (1); acoustics and optics (3); geology (3); chemical practice (5).

Third Term.—Chemical philosophy (3); chemical technology (2); acoustics and optics (3); chemical practice (7).

FOURTH OR SENIOR YEAR.

First Term.—History of philosophy (3); physical practice (4); chemical practice (10); organic chemistry (1),

Second Term.—Metallurgy *or* mineralogy (2); organic chemistry (2); chemical practice (8); physical practice (4).
Third Term.—Chemical technology (2); chemical processes (2); chemical practice (8); organic chemistry (1); thesis.

4. Courses in Civil Engineering.

A Four Years Course, Leading to the Degree of Bachelor of Civil Engineering.

FIRST OR FRESHMAN YEAR.

First Term.—Geometry and conic sections (5); French *or* German (5); rhetoric and composition (2); free-hand drawing (3); six lectures on hygiene, commencing on the first Tuesday in the term.
Second Term.—Algebra (5); French *or* German (5); rhetoric and composition (2); right line drawing (2); free-hand drawing (3).
Third Term.—Trigonometry (5); descriptive geometry (4); French *or* German (5); botany (3).

SECOND OR SOPHOMORE YEAR.

First Term.—Analytical geometry (5); descriptive geometry (4); French *or* German (3); experimental mechanics (3); chemistry (2).
Second Term.—Analytic geometry of three dimensions (2); calculus (3); French *or* German (3); electricity and magnetism (2); chemistry (2); pen topography (2); tinting and shading (2).
Third Term.—Calculus (5); land surveying (4); electricity and magnetism (2); chemistry (2); lettering (2); essays (1).

THIRD OR JUNIOR YEAR.

First Term.—Integral calculus (5); geology (3); shades, shadows and perspective (3); heat (3); topographical mapping and sketching (2); essays (1).
Second Term.—Advanced geology (3); analytic mechanics (5); mineralogy (2); acoustics and optics (3); graining and draughting details of structures (2).
Third Term.—Analytic mechanics (5); railroad surveying (5); acoustics and optics (3); colored topography (3).

FOURTH OR SENIOR YEAR.

First Term.—Spherical astronomy (5); analytic mechanics (5); architecture (3); stereotomy (3); draughting of original problems; technical essay.
Second Term.—Analytic mechanics (5); geodesy (5); stone cutting, original problems and draughting (5); metallurgy (2).

Third Term.—Civil engineering (3); engineering economy (2); bridge construction (5); water wheels (2); hydrographic surveying, chart making and geodetic practice (3); preparation of thesis.

Students in this course will be required to *write* memoirs upon subjects selected by themselves before the close of the spring term. During the last two years of the course they will be required to embody in their reports, reviews or memoirs of original investigations.

A FIVE YEARS COURSE.

Leading to the Degree of Civil Engineer.

The first and second years the same as in the preceding course. The studies in *italics* are introduced chiefly from the Course in Science and Letters, those in SMALL CAPITALS are new and of a technical character.

THIRD YEAR.

First Term.—Calculus (5); *Roman history* (5), *or physiology* (3), *and modern languages* (2); heat (2); topographical mapping (2); *essays and English literature* (2).

Second Term.—*Philosophy of history* (3); *history of the Roman empire* (5); *or, zoology* (3); *modern languages* (2); *or, instead of languages, essays* (1); *and English literature* (1); mechanics (5); acoustics and optics (3); structural details (2).

Third Term.—Mechanics (5); railroad surveying (5); acoustics and optics (3); *mediæval history* (5); *or, laboratory work* (3); *and modern languages* (2); *or, instead of languages, essays* (1); *and English literature* (1).

FOURTH YEAR.

First Term.—Geology (3); mechanics (5); Egyptian, Greek, and Roman architecture (3); shades, shadows and perspective (3); civil engineering (2); *American history* (2); *or, general literature and oratory* (3).

Second Term.—Geology (3); mechanics (5); *American history* (2); *or, Romanesque architecture* (3); *or, modern languages* (2); *political economy* (2); *general literature and oratory* (3).

Third Term.—Civil engineering (3); *logic* (3); *or, modern languages* (3); *or, general literature and oratory* (3); *or, Gothic architecture* (3); engineering economy (2); bridge construction (5); colored topography (3); two weeks hydrographic practice (3).

FIFTH YEAR.

First Term.—Spherical and practical astronomy (5); *modern history* (3); stereotomy and draughting (5); SPECIAL WORK IN

PROJECTS, DESIGNS AND ESTIMATES (3); or, RENAISSANCE ARCHITECTURE (3).

Second Term.—Geodesy (5); stone cutting (5); metallurgy (2); TECHNICAL READING IN FOREIGN LANGUAGES (2); SPECIAL WORK IN ASTRONOMY AND GEODESY (3).

Third Term.—*American law and polity* (5); *or, quarternions and philosophy of mathematics* (5); hydraulic motors (3); *historical reading* (2); hydrography (3); THE STEAM-ENGINE (2); original thesis.

On the satisfactory completion of the first four years of this course, students may take the degree of B. S., and become entitled to all the privileges of resident graduates.

5. The Course in Mechanic Arts.

Leading to the Degree of Bachelor of Mechanical Engineering.

FIRST OR FRESHMAN YEAR.

First Term.—Geometry and conic sections (5); French *or* German (5); free-hand drawing and shop practice (5).

Second Term.—Algebra (5); French *or* German (5); free-hand drawing and shop practice (7).

Third Term.—Trigonometry (5); French *or* German (5); descriptive geometry (4); shop practice (2).

SECOND OR SOPHOMORE YEAR.

First Term.—Analytical geometry (5); German *or* French (3); descriptive geometry (4); chemistry (2); shop practice (2).

Second Term.—Analytical geometry of three dimensions (2); calculus (3); German *or* French (3); chemistry (2); electricity and magnetism (2); shop practice (3).

Third Term.—Calculus (5); German *or* French (3); electricity and magnetism (2); chemistry (2); shop practice (3).

THIRD OR JUNIOR YEAR.

First Term.—Integral calculus (5); shades, shadows and perspective (3); heat (3); chemistry (2); rhetoric and composition (2); shop practice (3).

Second Term.—Acoustics and optics (3); machine construction and drawing (4); mechanics (5); rhetoric and composition (2); shop practice (3).

Third Term.—Machine construction and drawing (4); mechanics (5); mill work (4); shop practice (2).

FOURTH OR SENIOR YEAR.

First Term.—Mechanism (5); machine drawing (4); mechanics (5); shop practice (3).

Second Term.—Designing machinery (4); physical laboratory practice (4); steam-engine (5); shop practice (3).

Third Term.—Architecture (2); field practice and the use of instruments (3); special study (4); working draughts (4); shop practice and preparation of thesis (5).

IV. SHORTER COURSES.—LEADING TO NO DEGREE.

1. A THREE YEARS COURSE IN AGRICULTURE.

FIRST OR FRESHMAN YEAR.

First Term.—Geometry and conic sections (5); chemistry, agricultural (5); chemical practice (3); drawing, freehand (3).

Second Term.—Chemistry, agricultural (5); chemical practice (5); algebra (5).

Third Term.—Botany (5); entomology (5); trigonometry (5).

SECOND OR SOPHOMORE YEAR.

First Term.—Botany (5); geology (3); mechanics (3); veterinary anatomy and physiology (5).

Second Term.—Botany (5); chemical practice (5); veterinary medicine and surgery (5).

Third Term.—Botany (3); chemical practice (4); land surveying (3); veterinary medicine and surgery (5).

Third or Junior year same as the fourth year of the four years course.

2. A TWO YEARS COURSE PREPARATORY TO THE STUDY OF MEDICINE.

Requirements for admission the same as in the Natural History Course, except the year of French or German.

FIRST YEAR.

First Term.—French (5); physiology (3); heat or psychology (2); chemical laboratory practice (3); free-hand drawing (3); rhetoric and composition (2); six lectures on hygiene.

Second Term.—French (5); zoology (3); chemistry, lectures (3); chemical laboratory practice (3); free-hand drawing (3); rhetoric and composition (2).

Third Term.—French (5); general botany, lectures (3); botanical laboratory practice (2); lectures on chemistry (3); medical chemistry, laboratory practice (4); rhetoric and composition (2).

SECOND YEAR.

First Term.—German (5); organic chemistry (2); psychol-

ogy or heat (2); anatomy and physiology of domesticated animals (5); laboratory practice in anatomy (3); five lectures on medical entomology in alternate years.

Second Term.—German (5); vegetable physiology, or systematic and applied botany (3); acoustics and optics (3); veterinary medicine (5); laboratory practice in physiological anatomy and histology (3); laboratory practice in vegetable physiology (2).

Third Term.—Scientific German (3); comparative anatomy of the brain (2); acoustics and optics (3); veterinary medicine and surgery (5); laboratory practice in physiological anatomy (5).

Upon the completion of the course the student will receive a certificate, signed by the President and Professor of Physiology. This certificate, or one covering the same branches when pursued in other courses, is accepted by most medical schools as exempting the student from one of the three years now required for graduation in medicine.

3. A Two Years Course in History and Political Science.

Requirements for admission the same as for Optional Students, with the addition of Latin Grammar and four Books of Cæsar.

FIRST YEAR.

First Term.—Roman history (5); psychology (2); rhetoric and essays with Freshmen and Sophomores (3); French *or optional* (5); six lectures on hygiene beginning the first Monday in the term.

Second Term.—History of the Roman Empire (5); moral philosophy (2) rhetoric and essays with Freshmen and Sophomores (3); French *or optional* (5).

Third Term.—Mediæval history (5); logic (3); rhetoric and essays with Freshmen and Sophomores (3); French *or optional* (5).

SECOND YEAR.

First Term.—Modern history (3); American history (2); English literature (1); essays with the Juniors (1); general literature and oratory (3); German *or optional* (5).

Second Term.—American history (2); philosophy of history (3); political economy (2); English literature (1); essays with the Juniors (1); general literature and oratory (3); German *or optional* (5).

Third Term.—American law (5); English literature (1); essays with the Juniors (1); general literature and oratory (3); German *or optional* (5).

On the completion of the course the student will have a certificate to that effect, signed by the President and the Dean of the Faculty of History and Political Science.

EXAMINATION PAPERS.

ENTRANCE EXAMINATIONS.

[*The following are specimens of the papers given to candidates for admission at the Entrance Examinations. In Greek and in Latin, an oral examination was added to the written one.*]

ARITHMETIC.

1. Write the Metric table of Long Measure. What is meant by each of the prefixes, from *milli*—to *myria*—inclusive? How many cubic centimeters in a liter? In a gramme of distilled water? In a kilogramme of water? A cubical block whose edge is 250 millimeters is made of wood $\frac{4}{5}$ as heavy as distilled water. Find its weight in kilogrammes; also in pounds and ounces Avoirdupois, the kilogramme being about $2\frac{1}{5}$ lbs.

2. Define a Prime Number; Numbers prime to each other; the Least Common Multiple of two or more numbers. Find the greatest common divisor and the least common multiple of 437, 551, and 703.

3. Define an Integer; a Complex Fraction; a Compound Fraction. What is the reciprocal of $\frac{1}{3}$? Of $\frac{3}{8}$? Of 5? What does the denominator of a fraction represent? The numerator? Why is the value of the fraction unchanged when both terms are multiplied by the same number? Arrange in the ascending order of magnitude the fractions $\frac{11}{30}$, $\frac{19}{21}$, and $\frac{1}{3}$.

Simplify $$\frac{1}{1+\dfrac{2}{3\frac{1}{3}}}.$$

4. Divide 2.56 by .0032. By 3.2. By 320. State and demonstrate the rule for pointing off in multiplication of decimals. Make the following circulating decimals similar and conterminous; and add them: $.\dot{2}$, $.1\dot{8}$, $.\dot{2}5\dot{6}$.

5. On a note for \$1500, dated Jan. 1, 1876, and bearing interest at 7 per cent., were the following indorsements: April 1, 1876, \$250; Dec. 5, 1876, \$400. What was due Jan. 1, 1877?

GEOGRAPHY.

1. Describe the systems of mountain chains by which the surface of the earth is traversed.
2. Describe the table-lands of Asia.
3. Describe the Great Northern Plain of Europe.
4. What is the average depth of oceans?
5. Name the principal ocean currents.
6. Bound Holland; Turkey in Europe; Switzerland.
7. Bound Beloochistan; China Proper; Arabia.
8. Bound Idaho; Missouri; Maryland.
9. Bound Bolivia; Uraguay; The Argentine Republic.
10. Over what waters would one sail from Philadelphia to the Crimea.
11. Over what waters would one sail from Bombay to Lyons?
12. Over what waters would one sail from Yokohama to Paris?
13. What countries would one pass on the right in coasting from Honduras to Alaska?
14. What countries would one pass on the left in coasting from Calcutta to Behring's Straits?
15. Name the countries of Africa.
16. Name the rivers of Spain, of France, of Germany, of Italy.
17. Over what countries would a straight line from Pekin to Madrid pass?
18. What productions of Africa form articles of commerce with the United States?
19. How could one go by water from Montevideo to Pittsburgh?

ENGLISH GRAMMAR.

1. Explain the use of *either* and *or*, *neither* and *nor*, *each*, *both*, *whither* and *whether*, *whence* and *thence*.
2. Mention the gutturals, dentals, and labials of the English alphabet.
3. What is meant by "parts of speech"?
4. State the use or function of each of the parts of speech.
5. When is a noun said to be in the objective case?
6. Give four examples of irregular comparison in adjectives.
7. How are reflexive pronouns formed?
8. Why are some pronouns called relative?
9. Is an objective case ever used after intransitive verbs?
10. Define *inflection*, *intransitive*, *finite*, *mood*, *participle*, *orthography*, *diminutive*, *orthoëpy*, *exception*.
11. Name some adverbs of negation; of cause and effect.
12. In what ways may the grammatical subject be enlarged?
13. When is a noun or an adjective used predicatively?
14. Give a definition of the two "parts of speech" required to form a sentence.

15. Change into the singular number the entire subject and the verb in the sentence: Those men are building houses.

16. When is *e* mute omitted at the end of a word, and when is it retained, a syllable being added?

17. State some of the uses of *it*.

18. State the grammatical relation and etymology of each word in the following sentence: Short his career, but ably run.

19. What is the objective or factitive predicate?

20. Write out correctly the following sentences:

(*a*) One fine afternoon everybody was on deck amusing themselves as they can.

(*b*) Whom but he was true to me.

(*c*) Lord Macaulay has been bolder than his predecessors; he has shrank from no conclusion.

(*d*) Which rule, if it had been observed, a neighboring prince would have wanted a great deal of that incense which has been offered up to him.

(*e*) Their chairs did not touch; they were placed one on either of the four sides of the table, leaving the fourth vacant.

(*f*) Man could now travel further in an hour than he had previously in a day.

(*g*) Six month's interest are due.

(*h*) He is a worthy representative of the great principles on whom Republicanism has always and must stand.

(*i*) Nothing need to be said so firmly and nothing oftener than this.

(*k*) How will we know which is the greatest of the two?

21. Give an example of the formation of the past tense from the present, by a change (*a*) of vowel; (*b*) of termination; (*c*) by no change.

22. Write a sentence containing an adjective clause, drawing a line under the clause.

23. Write an interrogative sentence, and parse it.

24. Write a sentence in which the verb has a direct and an indirect object, stating which is the direct and which the indirect.

PLANE GEOMETRY.

1. If the opposite sides of a quadrilateral be equal each to each, the equal sides are parallel, and the figure is a parallelogram.

2. To draw a common tangent to two given circles; and demonstrate.

3. Two triangles are similar, if their homologous sides be proportional.

4. The 4 bisectors of the angles of any quadrilateral form in general a second quadrilateral whose opposite angles are supplementary.

5. The surface [or the perimeter] of a regular inscribed polygon

and that of a similar circumscribed polygon being given, to find the surfaces [or the perimeters] of the regular inscribed and circumscribed polygons having double the number of sides.

ELEMENTARY PHYSIOLOGY.

For the present no questions will be asked upon the Nervous System, or Organs of Sense. Omitting these subjects, students are advised to prepare for the examination by the aid of either of the following named works:

1. Newton's Introduction to Animal Physiology, with Directions for Practical Work. 5th ed. 16 mo., pp. 186, 98 figures. London, 1878.
2. Foster's Primer of Physiology. 3d ed. 16 mo., pp. 132, 18 figures. London, 1878.
3. Dalton's Physiology and Hygiene. 12 mo., pp. 424, 78 figures. New York, 1878.
4. Huxley and Youman's Physiology and Hygiene. 12 mo., pp. 485, 128 figures. New York.
5. Cleland's Animal Physiology. 16 mo., pp. 325, 158 figures.
6. Steele's Fourteen Weeks in Physiology.
7. Cutter's Anatomy, Physiology and Hygiene.
8. Hutchinson's Physiology.

In addition to the works above named, there are others which furnish the requisite information, and of course the larger Manuals of Foster, Dalton, Flint, Küss, Draper, Carpenter, etc., are more than sufficient. The three first-named are recommended to students who take the course upon Physiology in the University.

In place of, or in addition to, the text-book study above indicated, students are advised to make themselves *practically* familiar with the structure, properties and functions of tissues and organs, as presented in Huxley and Martin's Elementary Biology (sections upon Amæba and Frog), and Foster and Langley's Practical Physiology, lessons I–XIV inclusive. The cat may be substituted for the dog and rabbit.

The following questions may indicate the nature of the examination:

1. Name the chemical elements of the body, stating which are gases.
2. What first happens to milk in the stomach?
3. Enumerate the digestive fluids, stating which is acid.
4. State all the uses of the stomach.
5. What is the object of digestion?
6. Give a diagram of the right side of the heart.
7. What is the heart composed of?
8. What are the differences between the air inspired, and the air expired?
9. Give some familiar examples of acids.

10. Give some familiar example of alkalies.

11. Which way does blood flow in the arteries of the arm? Which way in the veins of the arm? How do you know?

12. Explain the pulse.

13. Name the uses of the tongue.

14. Name the uses of the lips and cheeks.

15. What happens in the throat when you swallow?

ALGEBRA THROUGH QUADRATICS.

1 (*a*). Remove the parentheses from

$$3a^2-2b\left\{a+\frac{a}{b}[a-\tfrac{1}{2}(b+c)]\right\},$$

simplify the result, and find its value when $a=-2$, $b=3$, $c=0$.

(*b*). Divide $6x+4^4x+1+3x^2$ by $-2x+3+2x^2$, finding the quotient to 3 terms, the remainder, and the "complete quotient."

2 (*a*). What is meant by "a negative quantity"? Is $(-m)$ a positive or a negative quantity, if $m=-3$?

(*b*). What is the value of 0×0? Of 0×3? Of $\frac{8}{0}$? Of $\frac{0}{8}$, and why? Of $\frac{0}{0}$, and why?

(*c*). Into a cistern whose capacity is 1000 gallons and which is now half full, n gallons of water flow per minute, and 10 gallons flow out. How soon will the cistern be empty? Interpret your result when $n=10$; also when $n=15$.

3 (*a*). Factor completely $2ax^4-2ay^4$; also, $1+8a^3b^3$.

(*b*). Prove that when m is a whole number, a^m-b^m is always divisible by $a-b$.

4. Simplify $\left(\frac{x^2-y^2}{x^2+y^2}-\frac{x^2+y^2}{x^2-y^2}\right)\div\left(\frac{x-y}{x+y}-\frac{x+y}{x-y}\right)$.

5 (*a*). Find x, y and z from the equations $3x+2y+z=0$, $5x+3y+z=-1$, $2x-y+z=0$.

(*b*). Solve the equation $\sqrt{(x+11)}-\sqrt{x}=1$, and verify your result.

(*c*). Find how far you must ride at the rate of a miles an hour, and walk back at the rate of b miles an hour, to be gone c hours.

6 (*a*). Reduce the following radicals to their simplest form, and add them: $\frac{3}{4}(\sqrt[3]{96})$, $\sqrt[3]{\frac{3}{2}}$, $144^{\frac{1}{6}}$.

(*b*). Simplify $\dfrac{3^{-\frac{1}{3}}\,a^{\frac{4}{5}}}{3^{\frac{2}{3}}\,a^{-\frac{6}{5}}}(2b)^0$; also, $(5^{\frac{2}{3}})^{\frac{3}{4}}$.

(*c*). Multiply $\left(a^{\frac{n}{2}}+a^{-\frac{n}{2}}\right)$ by $\left(a^{\frac{n}{2}}-a^{-\frac{n}{2}}\right)$,

7 (*a*). What is the value of $\sqrt{-5}\times\sqrt{-5}$, and why?

(*b*). Multiply $3+\sqrt{-2}$ by $\sqrt{2}-2\sqrt{-1}$.

8 (*a*). Solve the quadratic equation $x^2-5x+2=0$.

(*b*). Solve the equation $2x^2+8px=q$. What is meant by "a

root of an equation"? What conditions must p and q satisfy in order that the two roots of the above equation may both be real and positive? Both imaginary? Equal to each other?

(c). Form the quadratic whose roots are $2+\sqrt{3}$ and $2-\sqrt{3}$.

9. Extract the square root of $$x^4-x^3+\frac{x^2}{4}+4x-2+\frac{4}{x^2}.$$

FRENCH.

1. The house which you bought this week is that which was built a year ago. Is it not?

2. You must go and see it, but I do not believe that you can tell me if it is the same house.

3. Are you not afraid that the soldier will hurt the child? He has the French knives which he stole this morning from your father.

4. My sister was afraid that he was not coming, and I do not believe that she is wrong.

5. He wanted you to set out from Paris, but I do not think that you have money enough.

6. Are you my father's scholar of whom I have heard him speak? I am.

7. It is not I to whom you wrote, it is one of my younger brothers. I have just sent for him.

8. Whose silk is that which I saw in the store of the old English merchant? I would like to buy some. Who will sell me some?

9. My father is the best friend I have and I will give him the only horse I have.

10. It was in vain for her mother to reproach her, she said yesterday she was going to marry the French cook.

11. Do you know those ladies with whom we were speaking French when we were riding on horseback?

12. Where are the goods which you have just sold and which you wished my servant to carry to my house?

13. The birds you saw killed this morning are partridges, and I have bought some and will have them roasted to-morrow.

14. Do you remember the songs we heard him sing this summer, at your uncle's house? Would you not wish him to come and see us?

15. Would you wish her every day to sing French songs, read French books, write French exercises, and talk with certain good people?

GERMAN.

I.

1. Translate:

Aus "Undine."

Von dem, was dem Ritter im Walde begegnet war.

"Es mögen nun etwa acht Tage her sein, da ritt ich in die freie Reichsstadt ein, welche dort jenseit des Forstes gelegen ist. Bald darauf gab es darin ein schönes Turnieren und Ringelrennen, und ich schonte meinen Gaul und meine Lanze nicht. Als ich nun einmal an den Schranken still halte, um von der lustigen Arbeit zu rasten, und den Helm an einen meiner Knappen zurück reiche, fällt mir ein wunderschönes Frauenbild in die Augen, das im allerherrlichsten Schmuck auf einem der Altane stand und zusah. Ich fragte meinen Nachbar, und erfuhr, die reizende Jungfrau heisse Bertalda, und sei die Pflegetochter eines der mächtigen Herzoge, die in dieser Gegend wohnen. Ich merkte dass sie auch mich ansah. und—wie es nun bei uns jungen Rittern zu kommen pflegt—hatte ich erst brav geritten, so ging es nun noch ganz anders los. Den Abend beim Tanze war ich Bertalda's Gefährte, und das blieb so alle die Tage des Festes hindurch."

2. Parse the following nouns, writing the genitive singular and nominative plural of each: *Tage* (1), *Forstes* (2), *Ringelrennen* (3), *Arbeit* (5), *Knappen* (6,) *Pflegetochter* (10).

3. Parse fully the following verbs, giving the principal parts, rule for the mood, tense, and position of each: *mögen* (1), *ritt* (1), *gelegen ist* (2), *gab* (3), *halte* (5), *fällt* (7), *zusah* (8), *heisse* (10).

II.

1. Translate:

Man höret oft im fernen Wald
Von obenher ein dumpfes Läuten,
Doch Niemand weiss von wann es hallt,
Und kaum die Sage kann es deuten.
Von der verlor'nen Kirche soll
Der Klang ertönen mit den Winden;
Einst war der Pfad von Wallern voll,
Nun weiss ihn keiner mehr zu finden.

Jüngst ging ich in dem Walde weit,
Wo kein betret'ner Steig sich dehnet,
Aus der Verderbniss dieser Zeit
Hatt' ich zu Gott mich hingesehnet.
Wo in der Wildniss Alles schwieg,
Vernahm ich das Geläute wieder;
Je höher mein Sehnsucht stieg,
Je näher, voller klang es nieder.

Mein Geist war so in sich gekehrt,
Mein Sinn vom Klange hingenommen,
Dasz mir es immer unerklärt,
Wie ich so hoch hinauf gekommen.
Mir schien es mehr denn hundert Jahr',
Dasz ich so hingeträumet hätte:
Als über Nebelen, sonnenklar,
Sich öffnet eine freie Stätte.

2. Comment upon the following words, explaining any peculiarity in form, use, or meaning; point out derivative words and explain their origin: *obenher* (2), *Niemand* (3), *soll* (5), *Wallern* (7), *keiner* (8), *finden* (8), *jüngst* (9), *Steig* (10), *Verderbniss* (11), *gekommen* (20), *hingeträumet hätte* (22).

3. Define the clauses and their use introduced by *Wo* (10), *Dasz* (19), *Wie* (20), *Dasz* (22).

III.

Translate into German:

1. The prudent (*klug*) lady would have given advice to the old teacher, if he had allowed himself to be advised (*sich Rathe geben lassen*).

2. The young lady caused (*lassen*) the old serving-woman to be sent for (*holen*), who had fetched the letter.

3. Since (*da*) you have not sent us the letter, you will be obliged to cause the servant to fetch it.

4. If the traveler arrives (*ankommen*) to-day, then call me immediately.

5. Your friend understands the German language very well, but he speaks only a very little as yet, and he still takes lessons (*Unterricht*).

LATIN.

I.

1. Translate (Cic. in Cat., IV, 8):

Servus est nemo, qui modo tolerabili condicione sit servitutis, qui non audaciam civium perhorrescat, qui non haec stare cupiat, qui non quantum audet et quantum potest conferat ad communem salutem voluntatis. Quare si quem vestrum forte commovet hoc quod auditum est, lenonem quendam Lentuli concursare circum tabernas, pretio sperare posse sollicitari animos egentium atque imperitorum, est id quidem coeptum atque temptatum, sed nulli sunt inventi tam aut fortuna miseri aut voluntate perditi, qui non illum ipsum sellae atque operis et quaestus cotidiani locum, qui non cubile atque lectulum suum, qui denique non cursum hunc otiosum vitae suae salvum esse velint.

2. Give the syntax of *condicione*, *voluntatis*, *concursare*, *for-*

tuna. Explain the subjunctives *sit, cupiat, velint.* Decline *nemo, vestrum, operis, quaestus.* To what classes of verbs do *perhorrescat, audet,* and *concursare* belong? Give the principal parts of *cupiat, audet, coeptum est.* Give the synopsis of *velint* in the second person singular. Give all the participles, infinitives, and imperative forms of *conferat.* Compare *bene, felix, facilis, primus, vetus.* State the time, place, and manner of Cicero's death.

II.

1. Translate (Virg. A. IV, 238–241):

Dixerat. Ille patris magni parere parabat
Imperio; et primum pedibus talaria nectit
Aurea, quae sublimem alis sive aequora supra
Seu terram rapido pariter cum flamine portant.

2. Who are meant by *Ille* and *patris?* Divide the passage into feet, and give rules for the quantities of vowels in the first line.

III.

Translate into Latin:

(1) He says that he has not many books. (2) Do you know how high this tree is? (3) I hope that our friend, after seeing the king, will come to Rome. (4) He fears that he cannot go to-day. (5) Tell me whether you are to come alone, or with your daughters.

GREEK.

[*N.B.*—Write the Greek words *with their accents.*]

I.

Translate any *three* of the following five passages, and answer the questions under *all* of them.

1. *Ξενοφῶν δὲ, παρελαύνων ἐπὶ τοῦ ἵππου, παρεκελεύετο· Ἄνδρες, νῦν ἐπὶ τὴν Ἑλλάδα νομίζετε ἁμιλλᾶσθαι, νῦν πρὸς τοὺς παῖδας καὶ τὰς γυναῖκας, νῦν ὀλίγον πονήσαντες ἀμαχεὶ τὴν λοιπὴν πορευσόμεθα.*

Give the gen. and dat. in all numbers of *Ἄνδρες*: the voc. sing. and the gen. plur. of *παῖδας.*

2. *Ταύτην μὲν οὖν τὴν νύκτα ἔμειναν ἐν πολλῇ ἀπορίᾳ ὄντες. Ξενοφῶν δὲ ὄναρ εἶδεν· ἔδοξεν ἐν πέδαις δεδέσθαι, αὗται δὲ αὐτῷ αὐτόμαται περιρρυῆναι, ὥστε λυθῆναι καὶ διαβαίνειν ὁπόσον ἐβούλετο.*

Give the nom. sing. and plur. in all genders of *ταύτην*: dat. plur. in all genders of *ὄντες*: synopsis of the tense and voice to which *ἔμειναν* belongs. In what tense, mood, voice, and from what verbs are *εἶδεν, δεδέσθαι, περιρρυῆναι?*

3. *Ταῦτα ἐννοούμενοι καὶ ἀθύμως ἔχοντες, ὀλίγοι μὲν*

αὐτῶν εἰς τὴν ἑσπέραν σίτου ἐγεύσαντο, ὀλίγοι δὲ πῦρ ἀνέκαυσαν, ἐπὶ δὲ τὰ ὅπλα πολλοὶ οὐκ ἦλθον ταύτην τὴν νύκτα.

Give the principal parts of *ἔχοντες, ἀνέκαυσαν, ἦλθον.* Explain the phrase *ἀθύμως ἔχοντες*: the *case* of *σίτου.*

4. *Παύσασθε ἁμάρτοντες ἐς τὴν πατρίδα, καὶ μὴ πείθεσθε τοῖς ἀνοσιωτάτοις τριάκοντα, οἳ ἰδίων κερδέων ἕνεκα ὀλίγου δεῖν πλείους ἀπεκτόνασιν Ἀθηναίων ἐν ὀκτὼ μησὶν ἢ πάντες Πελοποννήσιοι δέκα ἔτη πολεμοῦντες.*

Give the acc. sing. in all genders of *πλείους*: the first seven cardinal numerals in Greek. Who were *the Thirty*, and how did they come into power?

5. *Καὶ γὰρ ἐν ταῖς μάχαις πολλάκις δῆλον γίγνεται ὅτι τό γε ἀποθανεῖν ἄν τις ἐκφύγοι καὶ ὅπλα ἀφεὶς καὶ ἐφ' ἱκετείαν τραπόμενος τῶν διωκόντων· καὶ ἄλλαι μηχαναὶ πολλαί εἰσιν ἐν ἑκάστοις τοῖς κινδύνοις ὥστε διαφεύγειν θάνατον, ἐάν τις τολμᾷ πᾶν ποιεῖν καὶ λέγειν.*

Give synopsis of the tense and voice to which *ἀφείς* belongs. Point out the enclitics in this passage. Explain the mood of *τολμᾷ.*

II.

Translate into Attic Greek: The men came to him, saying that they did not wish to march that night. Accordingly he remained, that they might not be despondent.

III.

Translate:

Ἔγρετο δ' ἐξ ὕπνου· θείη δέ μιν ἀμφέχυτ' ὀμφή·
Ἕζετο δ' ὀρθωθείς· μαλακὸν δ' ἔνδυνε χιτῶνα,
Καλὸν, νηγάτεον· περὶ δὲ μέγα βάλλετο φᾶρος·
Ποσσὶ δ' ὑπὸ λιπαροῖσιν ἐδήσατο καλὰ πέδιλα·
Ἀμφὶ δ' ἄρ' ὤμοισιν βάλετο ξίφος ἀργυρόηλον.

Give the Attic form of *θείη* and *ποσσί.* In what tense, mood, voice, and from what verbs, are *ἔγρετο* and *ἀμφέχυτο*? Scan the last line.

Τὴν δὲ χολωσαμένη προσεφώνεε δῖ' Ἀφροδίτη·
Μή μ' ἔρεθε, σχετλίη, μὴ χωσαμένη σε μεθείω,
Τὼς δέ σ' ἀπεχθήρω, ὡς νῦν ἔκπαγλ' ἐφίλησα,
Μέσσῳ δ' ἀμφοτέρων μητίσομαι ἔχθεα λυγρά,
Τρώων καὶ Δαναῶν, σὺ δέ κεν κακὸν οἶτον ὄληαι.

Give the Attic form of *προσεφώνεε, μέσσῳ, ὄληαι.* In what tense, mood, voice, and from what verbs, are *ἀπεχθήρω* and *ὄληαι*?

SOLID GEOMETRY.

1. The sum of any two face-angles of a triedral angle is greater than the third.

2. Two prisms are equal, if three faces including a triedral angle of the one are respectively equal to three faces similarly placed and including a triedral angle of the other.

3. The angle of two arcs of great circles is equal to the angle of their planes, and is measured by the arc of a great circle described from the vertex as a pole and included between its sides (produced if necessary).

4. The diameter of a sphere is 20 inches. Find its convex surface, its volume, and the area of a zone whose altitude is 20 inches.

The magnitudes of the angles of a triangle upon the above sphere are $85°$, $100°$, and $130°$. Find the area of the spherical triangle in square inches.

PLANE AND SPHERICAL TRIGONOMETRY.

[Those examined only in Plane Trigonometry omitted Questions 6, 7 and 8. Those examined in Trigonometry entire omitted Questions 1 (a) and 5.]

1 (*a*). Express the six trigonometric functions as ratios, and show what function is the reciprocal of each.

(*b*). Show that $\sin(180° - A) = \sin A$, and $\tan(180° - A) = -\tan A$.

2 (*a*). Trace the changes in the sign and value of $\cos A - \sin A$, as A changes from $0°$ to $180°$.

(*b*). Find the six logarithmic functions of $243° \; 25' \; 5''$. What functions of this angle are negative?

3. Two sides of a plane triangle are 10 and 20, and the included angle is $60°$. Find (*a*) the area; (*b*) the remaining side; and (*c*) the remaining angles.

4 (*a*). Prove that $\cos(A+B) = \cos A \cos B - \sin A \sin B$; and hence show that $\cos 2A = 2\cos^2 A - 1 = 1 - 2\sin^2 A$.

(*b*). Obtain the value of $\sin A$ in terms of $\tan A$.

(*c*). If $\tan A = 2\sin A$, find the value of A.

5. In a plane triangle, given $a = 584.7328$, $b = 367.4001$, and $B = 37° \; 42' \; 13''$, find the remaining angles and side.

6. Prove that, in a spherical triangle right-angled at C, $\sin a = \sin A \sin c$.

7. From the formula $\cos a = \cos b \cos c + \sin b \sin c \cos A$, derive the formula

$$\tan \tfrac{1}{2} A = \sqrt{\frac{\sin(s-b)\sin(s-c)}{\sin(s-a)\sin s}}.$$

8. Given $a = 36°$, $b = 49° \; 37' \; 34''$, $c = 76° \; 14' \; 26''$, find A.

ADVANCED ALGEBRA.

1 (*a*). Demonstrate the following formula in Geometrical Progression:

$$S=\frac{a(r^n-1)}{r-1}$$

(*b*). Find the sum of the series $1-\frac{1}{3}+\frac{1}{9}-\frac{1}{27}+\ldots$ to six terms; also, to infinity. What do you understand by the sum of an infinite series?

2. Reduce $\pi,=\frac{31416}{10000}$, to a continued fraction; and from this, find three successive approximate values of π.

3. Find the number of combinations of ten things, taken four at a time; and give the reasoning.

4. Write and demonstrate the Binomial Formula.

5. By the Method of Differences, find the 101st term of the series 1, 7, 15, 25, 37, . . ; and likewise the sum of the first 101 terms of this series.

6. Express $\frac{4x}{x^2-9}$ as the sum of two fractions whose denominators are $x+3$ and $x-3$, using the Method of Undetermined Coefficients.

7. What is meant by the logarithm of a number n in a system whose base is b? Prove that $\log n$, when the base is b, and $\log b$, when the base is n, are reciprocals of each other.

8. Prove that if r be a value of x that satisfies the equation

$$x^n+Ax^{n-1}+Bx^{n-2}+\ldots+K=0,$$

then the first member is divisible by $x-r$; and conversely.

9 (*a*). Write the equation whose roots shall be 0, -2, -2, $1+\sqrt{-1}$, and $1-\sqrt{-1}$.

(*b*). What are conjugate imaginaries? Prove that if the equation

$$x^n+Ax^{n-1}+Bx^{n-2}+\ldots+K=0$$

has imaginary roots, they are in pairs. [The known quantities A, B, . . . K are supposed to be real.]

10. Find a commensurable root of the equation $x^4+2x^3-x^2+35x+37=0$, then depress the degree of the equation, and find an incommensurable root to three decimals.

DEGREES AND PRIZES.

ORDER OF EXERCISES AT THE ELEVENTH ANNUAL COMMENCEMENT.

THURSDAY, JUNE 19, 1879.

The Lord's Prayer.

1. DISSERTATION—The Legitimate Function of the Scholar in Politics,
FRANK HAYWARD SEVERANCE, *Whitewater, Wis.*
2. THESIS IN MECHANIC ARTS—The Emery Wheel,
HENRY MARX, *Toledo, Ohio*
3. *ESSAY IN ARCHITECTURE—Symmetry and Symbolism in Architecture, FRANK AYLES WRIGHT, *Newburgh*
4. *THESIS IN CIVIL ENGINEERING—Review of Bridge 69, Susquehanna Division, on the Erie Railroad,
CHARLES VERNON MERSEREAU, *Union*
5. ORATION—The Genius of Sophocles as shown in the Antigone, JAMES AUGUSTUS HAIGHT, *Oshkosh, Wis.*
6. DISQUISITION—Is Suffrage a Natural Right?
EDWARD CHANNING RUSSEL, *Ithaca*
7. *MATHEMATICAL ESSAY—The Method of Equipollences, LENA LILIAN HILL, *Isle La Motte, Vt.*
8. *THESIS IN NATURAL HISTORY—Comparison of the Antebrachial Muscles of Man and Cat,
JOHN HENRY WEIR YOUNG, *Cold Spring*
9. *HISTORICAL ESSAY—The Influence of Madison and Hamilton on the Constitution,
LUTHER HENRY PORTER, *East Orange, N. J.*
10. *THESIS IN CIVIL ENGINEERING—The Wave of Translation, EUGENE EDWIN HASKELL, *Forestville*
11. ORATION—The Spirit of Modern Scientific Investigation,
EDITH WOODMAN BRADFORD, *Cambridge, Mass.*
12. DISSERTATION—The German and American Methods of Dealing with Socialism, FRED ELIAS SMITH, *Moravia*

13. *THESIS IN CIVIL ENGINEERING—Oblique Arches,
FREDERIC SIMPSON, *Lodi*
14. ESSAY IN MECHANIC ARTS—The Influence of Mechanical Education on Invention,
WALTER CRAIG KERR, *St. Peter, Minn.*
15. *ESSAY—Minority Representation,
WILLIAM SEYMOUR EDWARDS, *Coalburgh, W. Va.*
16. *THESIS IN VETERINARY SCIENCE—Pneumo-Enteritis Contagiosa,
ARTHUR MANLY FARRINGTON, *Orono, Me.*
17. *DISQUISITION—The Financial Views of John Locke,
GEORGE MATSON WELLES, *Elmira*
18. *THESIS IN ARCHITECTURE—Sanitary Precautions in House Building, NORIYUKI KOZIMA, *Tokio, Japan*
19. *THESIS IN MATHEMATICS—Maxima and Minima of a Function of Several Variables,
ARTHUR SAFFORD HATHAWAY, *Decatur, Mich.*
20. ORATION—The Oratory of William Pitt, Earl of Chatham,
EDMUND JUDSON MOFFAT, *Chatham*

THESES OF CANDIDATES FOR SECOND DEGREES.

21. *RENAL SECRETIONS,
HOWARD PERCY BELLOWS, B.S., *Boston, Mass.*
22. INUNDATIONS AT ITHACA: THEIR CAUSE,
FRANK E. BISSELL, B.C.E., *South Bend, Ind.*
23. *INUNDATIONS AT ITHACA: THEIR REMEDY,
FRANK ADAMS MAXWELL, B.C.E., *Clymer*
24. *THE FRISIAN LANGUAGE AND LITERATURE,
WATERMAN THOMAS HEWETT, A.M., *Ithaca*
25. THE WOODFORD ORATION—Toussaint L'Ouverture and Napoleon Bonaparte,
ALFRED MILLARD, *Omaha, Neb.*

Presentation of Prizes.

Conferring of Degrees and Certificates by the Acting President.

BENEDICTION.

*Not read.

DEGREES CONFERRED IN 1879.

The following is a list of those who received degrees at the annual Commencement at the close of the eleventh academic year, together with the degrees conferred and the residence of each recipient:

FIRST DEGREES.

BACHELORS OF ARTS, (7).

Abraham Cane,	Plattsburgh.
George Alexander Dounce,	Elmira.
James Augustus Haight,	Oshkosh, Wis.
David Ellis Morris,	Cincinnati, Ohio.
Mary Merrill Pitcher,	Owego.
Edward Channing Russel,	Ithaca.
Seward Adams Simons,	Buffalo.

BACHELORS OF LITERATURE, (7).

Mary Frances Conde,	Glenville.
Edward Cole Howland,	Poughkeepsie.
Harriet Mary Mills,	Syracuse.
Edmund Judson Moffat,	Chatham.
Elsie Manderville Patten,	Binghamton.
Sarah Jackson Russel,	Ithaca.
Mary Elizabeth Weed,	North Rose.

BACHELORS OF SCIENCE.

Science and Letters, (31).

William Maxon Alberti,	New Market, N. J.
Clarence Newman Blowers,	Syracuse.
Edith Woodman Bradford,	Cambridge, Mass.
Walter Chandler,	Weldon, Ill.
William Seymour Edwards,	Coalburgh, W. Va.
Stanford Jay Gibson,	South New Berlin.
Harold Gifford,	Milwaukee, Wis.
Hattie Lucina Green,	South Byron.
Lena Lilian Hill,	Isle La Motte, Vt.
Virgil Newland Hostetler,	Decatur, Ill.
Willis Arnold Ingalls,	Peterboro.
Caroline Cook Jackson,	New York City.
Robert Streator Kent,	Bay Ridge.
Charles Otho Lucas,	Greenville, Ohio.
Ervin Barnes Macy,	Port Byron.
Edmund Magner,	Andover.
Alfred Millard,	Omaha, Neb.
Edmund Royce Morse,	Rutland, Vt.
Whitney Newton,	Denver, Col.
William Bernard Philipp,	Cincinnati, Ohio.
Luther Henry Porter,	East Orange, N. J.

CLAYTON RYDER,	Carmel.
FRANK HAYWARD SEVERANCE,	Whitewater, Wis.
FRED ELIAS SMITH,	Moravia.
MOSES JAY SPAULDING,	East Poultney, Vt.
CALVIN TOMKINS,	Newark, N. J.
JAMES WARD WARNER,	Rock Stream.
ALFRED WASHBURN,	Chappaqua.
JOHN HENRY WEINMANN,	St. Johnsville.
GEORGE MATSON WELLES,	Elmira.
JULIUS HAYDEN WOODWARD,	Brandon, Vt.

In Natural History, (1).

JOHN HENRY WEIR YOUNG,	Cold Spring.

In Mathematics, (1).

ARTHUR SAFFORD HATHAWAY,	Decatur, Mich.

BACHELOR OF VETERINARY SCIENCE, (1).

ARTHUR MANLY FARRINGTON, (B.S.)	Orono, Me.

BACHELORS OF ARCHITECTURE, (4).

ALBERT BUCHMAN,	New York City.
ADOLPH FLEISCHMAN,	Albany.
NORIYUKI KOZIMA,	Tokio, Japan.
FRANK AYRES WRIGHT,	Newburgh.

BACHELORS OF CIVIL ENGINEERING, (10).

NICHOLAS EPHRAIM FERGUSON,	New Milford.
EUGENE EDWIN HASKELL,	Forestville.
ROBERT HERMAN,	Washington, D. C.
JAMES CARROLL KENNEDY,	Troy, Vt.
CHARLES VERNON MERSEREAU,	Union.
WILLARD OLNEY,	Westernville.
GEORGE FREDERIC SIMPSON,	Lodi.
FRANK WOODWARD SKINNER,	Brownville.
WILLIAM JOSEPH SMITH,	Charleston.
ADDISON WEED,	North Rose.

BACHELORS OF MECHANICAL ENGINEERING, (5).

WALTER CRAIG KERR,	St. Peter, Minn.
JOHN LEWIS,	Ithaca.
HENRY MARX,	Toledo, Ohio.

ROBERT AUGUSTUS PARKE,	Binghamton.
JOSE PIRATININZA TIBIRICA,	S. Paulo, Brazil.

SECOND DEGREES.

MASTER OF SCIENCE, (1).

HOWARD PERCY BELLOWS, B.S.,	Cornell.

CIVIL ENGINEERS, (2).

FRANK E. BISSELL, B.C.E.,	Cornell.
FRANK A. MAXWELL, B.C.E.,	Cornell.

DOCTOR OF PHILOSOPHY, (1).

WATERMAN T. HEWETT, A.M.,	Amherst.

PRIZES AWARDED.

Woodford Prize in Rhetoric and Oratory—a gold medal—A. Millard.

Horace K. White prizes in Veterinary Science:

1st Prize of twenty dollars—to G. M. Welles.

2d Prize of ten dollars—to E. C. Russel.

PRIZES FOR UNDERGRADUATES FOR 1879–80:

No student is allowed to be a competitor for any of the following prizes who has not satisfactorily passed all his examinations for the terms preceding that in which he offers himself as a competitor. Nor will the prizes be awarded to any one who so far neglects his other studies as to fail to pass any of his required examinations at the close of the term in which the competition takes place.

THE WOODFORD PRIZE.

A gold medal of the value of *One Hundred Dollars*, founded by the Honorable Stewart Lyndon Woodford, late Lieutenant-Governor of New York, will be given annually for the best English Oration, taking into account both matter and manner..

The subjects for the Woodford prize the present year are as follows:

1. Aim of actors and agents in history and the historical results.
2. Daniel Webster and the Constitution.
3. The Greek city, and the New England township.

4. Woman in the Grecian tragic poets.
5. The policy of aggrandizement in Nations.
6. The best representatives of the Hellenic spirit.
7. The political issues of the future.
8. Schiller's ode, "The Ideal and Life."
9. The constructive character of our age.
10. The perpetuity of the Greek and Latin languages.
11. Edmund Burke as a political philosopher.
12. The moral nature as the source of true oratory.
13. The peasant insurrections of the Middle Ages, and the modern "strike."
14. The imagination in science.
15. The requisites in a work of art.

THE HORACE K. WHITE PRIZE.

Established by Horace K. White, Esq., of Syracuse. To the most meritorious student in Veterinary Science, *Twenty Dollars*; to the second in merit, *Ten Dollars*.

ASSOCIATE ALUMNI.

By the Charter of the University the graduates, after they shall amount to one hundred in number, are entitled to elect one of the Board of Trustees each year. At a meeting called for the purpose, and held on Wednesday, June 26, 1872, the day preceding the annual commencement, representatives of all the classes that had graduated being present, the following organization was effected.

ARTICLES OF ASSOCIATION ADOPTED JUNE 26, 1872.

AMENDED JUNE, 1873.

I. The Alumni of Cornell University hereby constitute themselves an association to be known by the name of the Associate Alumni of Cornell University.

II. The object of this association is declared to be to promote in every proper way the interest of the University, and to foster among the graduates a sentiment of regard for each other, and attachment to their Alma Mater.

III. All graduates of this University who, by their diploma, are entitled electors of the University, are members of this association. All members of the Faculty of this University are honorary members of this association.

IV. The officers of this association shall consist of a president, and one vice-president from each graduating class, a corresponding secretary, a recording secretary and treasurer.

V. This association shall meet annually on the day preceding Commencement, at ten o'clock in the forenoon.

VI. Any proposition to alter or amend these articles of association must be made at a regular meeting and have the assent of two-thirds of the members present.

BY-LAWS, ADOPTED JUNE 26, 1872.

AMENDED JUNE, 1873.

ARTICLE I.

1. There shall be two standing committees, an executive committee and an auditing committee.

2. The executive committee shall consist of five members. The corresponding secretary of the association shall be *ex-officio* chairman of this committee. The recording secretary of the association shall be *ex-officio* secretary of this committee. The treasurer of the association shall be *ex-officio* treasurer of this committee; and the other two members shall be chosen by a plurality vote at each annual meeting of the association.

3. The auditing committee shall consist of three members, to be elected by the association at one ballot, the three members receiving the highest number of votes to be deemed and taken to be chosen.

4. The order of business at each regular meeting shall be as follows:—

(*a*) The secretary shall ascertain the names of the members present by roll call or otherwise.

(*b*) Reading the minutes of the last meeting.

(*c*) Treasurer's report and the referring of it to the auditing committee.

(*d*) Report of the executive committee.

(*e*) Reports of special committees.

(*f*) Miscellaneous business.

(*g*) Election of officers and committees.

(*h*) Election of Trustee or Trustees.

(*i*) Adjournment.

ARTICLE 2.

1. It shall be the duty of the corresponding secretary to keep a list of the graduates and their post-office addresses, to notify each member elected to an office of his election, and to send to each graduate a notification of the time of the meeting, and of the other exercises to take place under the auspices of the association.

2. In addition to their general duties the executive committee shall nominate members who are to take part in the literary exercises of each succeeding meeting of the association, their nomination to be confirmed or rejected by a majority vote of the members present.

3. The officers, whose election or appointment is not herein before provided for, shall be elected as follows: The president by a majority of all the members present. Each class shall elect the vice-president to which it is entitled.

4. All officers of this association shall hold their offices for one year from and after their election.

5. In the absence of the president, a vice-president shall preside, and the right to the chair shall be according to the seniority of the class to which the vice-presidents present shall belong.

6. In all the meetings of this association for all purposes except election of Trustees, which according to the statute of the State of New York, requires the presence of forty-five members, the members present shall constitute a quorum.

7. There shall be an annual tax of fifty cents upon each member, payable to the treasurer at each annual meeting.

OFFICERS FOR 1879–80.

President—S. F. BELKNAP, '73.

Vice-Presidents—C. F. HENDRYX, '69; J. L. MAXWELL, '70; J. E. MORE, '71; GEO. A. ISELIN, '72; L. G. BOIES, '73, E. O. RANDALL, '74; FRANK HISCOCK, '75; W. J. BERRY, '76; J. N. OSTROM, '77; R. H. TREMAN, '78.

Recording Secretary and Treasurer—W. R. LAZENBY, '74.

Corresponding Secretary—M. VAN CLEEF, '74.

Executive Committee—M. VAN CLEEF and W. R. LAZENBY, *ex officio*, and CLARENCE SMITH, H. R. DUDLEY, H. W. FOSTER.

Auditing Committee—G. B. TURNER, R. G. H. SPEED and J. S. COON.

Orator—L. G. BOIES, '73; Alternate, G. C. MOREHOUSE.

Poet—S. P. STURGES, '76; Alternate, C. F. ALLEN.

Essayist—IDA BRUCE, '76; Alternate, G. H. FITCH.

TRUSTEE ELECTED.

HON. S. D. HALLIDAY.

MEMBERS OF THE ASSOCIATION.

GRADUATED IN 1869, [8].

* The star denotes deceased graduates.

G. F. Behringer, A.B.
M. B. Buchwalter, A.B.
J. B. Foraker, A.B.
C. F. Hendryx, A.B.
J. Kirkland, A.B.
J. A. Rea, A.B.
D. W. Rhoades, A.B.
O. F. Williams, A.B.

GRADUATED IN 1870. [24]

A. A. Andrews, B.S.
*S. S. Avery, B.S.
J. S. Butler, B.S.
J. J. Chambers, Ph.B.
T. B. Comstock, B.S.
B. V. B. Dixon, A.B.
E. Douglas, A.B.
H. T. Eddy, C.E., (Ph.D., '72)
A. R. Greene, A.B.
S. D. Halliday, A.B.
E. D. Jackson, Ph.B.
H. V. L. Jones, Ph.B.
G. H. Lothrop, Ph.B.
G. M. Luther, B.S.
J. L. Maxwell, Ph.B.
P. Mosher, A.B.
C. J. Powers, B.S.
C. L. Powers, B. S.
E. F. Robb, A.B.
M. M. Ross, B.S.
P. G. Schoeder, Ph.B.
T. W. Spence, A.B.
C. A. Storke, A.B.
F. Walters, Ph.B.

GRADUATED IN 1871. [40]

W. S. Barnard, B.S.

L. H. Barnum, Ph.B.
G. A. Benton, A.B.
P. C. J. De Angelis, A.B.
A. B. Doerflinger, B.C.E.
A. H. Edgren, Ph.B.
W. Farnham, B.C.E., (C.E., '74).
A. N. Fitch, Ph.B.
O. Gillett, B.C.E.
E. J. Hadley, B.S.
W. H. Hayes, B.S.
* I. Hoagland, B.S., (Ph.B., '72).
S. F. Huntley, B.S.
K. W. Ingham, Ph.B.
G. W. Ingraham, A.B.
M. Kasson, B.V.S.
R. O. Kellogg, Ph.B.
E. D. Leffingwell, B.S.
J. J. Lockhart, B.S.
J. M. McNair, B.S.
W. S. McGregor, B.S.
J. E. More, A.B.
M. J. Morse, Ph.B.
J. O'Neill, A.B.
E. L. Parker, A.B.
C. E. Reeves, B.S.
F. H. Remington, B.S.
A. J. Rogers, Ph.B.
W. P. Ryman, B.S.
S. W. Salmon, B.C.E.
F. Schoff, B.C.E.
A. H. Sewell, B.S.
F. Sherman, B.S.
G.L.T. Smith, B.C.E., (C.E. '74).
M. A. Smith, B.C.E.
R. G. H. Speed, Ph.B.
R. Taft, B.S.
W. H. Tallmadge, A.B.
C. E. Van Cleef, B.S.
W. De L. Wilson, A.B.

GRADUATED IN 1872. [69]

A. M. Baldwin, Ph.B.
M. C. Bean, B.C.E.
C. H. Blair, A.B., (A.M., '76).
D. W. Bowman, B.C.E.
E. L. Brady, B.S.
G. F. Breed, Ph.B.
H. S. Buffum, B.S.
J. M. Chase, B.S.
I. E. Clark, B.C.E.
A. C. Clement, B.S.
A. W. Clinton, B.S.
D. Colburn, B.C.E.
M. T. Conklin, B.S.
*H.E.Copeland,Ph.B.,(M.S.,'75).
C. L. Crandall,B.C.E.,(C.E.,'76).
C. S. Crofoot, Ph.B.
Gram Curtis, B.C.E.
D. M. Darrin, B.S.
L. A. Foster, B.S.
F. W. Frost, B.C.E.
A. N. Fuller, B.S.
W. Harkins, B.S., (B. Lit., '73).
R. Headley, B.S.
H. C. Henderson, B.C.E.
I. N. L. Heroy, B.S.
W. E. Holcomb, B.S.
F. Holden, A.B.
R. B. Howland, B.C.E.
J. H. Hurd, B.S.
E. W. Hyde, B.C.E., (C.E., '74).
G. A. Iselin, B.S.
D. S. Jordan, M.S.
L. F. Judson, B.S.
M. Kellogg, B.S.
J. B. Lawrence, Ph.D.
W. N. B. Lawton, Ph.B.
W. B. Leach, B.S.
J. W. Mack, B.S.
J. T. McCollum, B.S.
T. J. McConnon, B.S.
E. E. McElroy, B.S.
F. D. Nash, B.S.
E. Nicoll, B.S.
W. H. Niles, B.S.
A. Osborn, A.B.
D. M. Page, B.S.
M. G. Peters, B.S.
A. C. Pike, B.S.
G. W. Pitts, B.S.
* H. G. Pollock, B.S.
C. S. Price, B.C.E.
A. L. Rader, Ph.B.
A. Rogers, B.C.E.
D.E. Salmon,B.V.M.,D.V.M.,'76.
T. Sanderson, A.B.
W. I. Scott, B.S.

G. P. Serviss, B.S.
C. B. Sill, B.C.E.
*C. Smith, B.S.
L. P. Smith, B.S., (Ag.B., '74).
M. G. Stolp, B.C.E.
S. P. Thomas, B.C.E.
J. E. Van De Carr, B.S.
J. De W. Warner, Ph.B.
A. C. Weeks, B.S.
S. N. Williams, B.C.E.
E. V. Wilson, B.S.
T. H. Wolford, B.S.
W. J. Youngs, B.S.

GRADUATED IN 1873. [95].

C. F. Allen, B.C.E.
H. Altman, B.S.
R. Anderson, B.M.E.
J. C. Averill, B.S.
A. B. Aubert, B.S.
R. Bacon, B.S.
E. Bartley, B.S.
S. F. Belknap, B.S.
H. E. Blake, B.C.E.
L. G. Boies, A.B.
J. W. Boothby, B.S.
S. W. Brown, B.S., (C.E.,'76).
Frank Carpenter, B.C.E.
F. H. Carver, B.S.
A. B. Cauldwell, B.S.
J. Chamberlin, B.S.
I. P. Church, B.C.E.
J. T. Cothran, A.B.
W. H. Denham, B.S.
O. A. Derby, B.S., (M.S.,'74).
G. Devin, B.C.E.
*E. T. Diefendorff, B.S.
E. G. Donaldson, B.Lit.
G. F. Dudley, B.S.
W. F. Duncan, B.S.
E. S. Eastman, Ph.B.
L. Elsbree, A.B.
L. Everett, B.S.
J. B. Ewell, B.S.
L. Falkenau, B.C.E., (C.E.,'77).
F. B. Ferriss, B.S.
P. D. Finnegan, A.B.
C. Finster, A.B.
N. K. Foster, B.S.
J. Frankenheimer, Ph.B.
*M. R. Frazer, A.B.
A. Gridley, B.S.
F. N. Hagar, A.B.
F. W. Halsey, B.S.
G. W. Harris, Ph.B.
A. C. Harwick, B.S.
J. W. Hill, B.M.E.
G. W. Horner, B.C.E.
E. M. Howard, B.S.
A. T. Hyde, B.C.E.
H. C. Johnson, A.B.
*F. H. Jones, B.Lit.
C. S. Joy, A.B.
F. W. Kelley, A.B., (Ph.D.,'74).
W. L. Klein, B.S.
F. J. Knight, B.C.E.
J. M. Knowles, B.S.
*D. E. Kohler, A.B.
C. Y. Lacy, Agr.B.
C. F. Lane, A.B.
D. T. Lawson, B.C.E.
W. Leland, B.S.
C. E. Lipe, B.M.E.
R. H. Lockwood, B.C.E.
G. F. Lyman, B.C.E.
D. W. J. Mesick, B.S.
J. L. Moffatt, B.S.
J. G. Moore, A.B.
G. C. Morehouse, B.S.
W. T. Morris, B.S.
J. G. Newkirk, A.B.
C. D. Page, B.S.
R. Parmely, B.S.
F. Parson, B.C.E.
G. E. Patrick, B.S., (M. S.,'74).
G. H. Phelps, B.S.
A. H. Phinney, (B.S.), Ph.D.
*K. Preston, B.C.E.
F. W. Proctor, B.S.
F. J. Root, B.C.E.
J. R. Schoonover, Arch.B.
E. H. Scofield, A.B.
J. F. Seybolt, B.S.
M. C. Sharp, Ph.B.
M. A. Shotwell, Ph.B.
C. D. W. Smith, B.S.,(M.S.,'75).
C. L. Smith, B.S.

S. Smith, B.S.
W. H. Smith, A.B.
H. L. Sprague, B.S.
W. L. Sprague, A.B.
H. D. Stevens, B.S.
*G. A. Tilley, B.C.E.
W. Tinning, B.S.
*J. H. Tompkins, B.C.E.
G. B. Turner, B.S.
M. W. Van Auken, A.B.
C. F. Wheelock, B.S.
T. S. White, B.C.E.
T. Worthington, Ph.B.

GRADUATED IN 1874. [64].

F. B. Alexander, B.C.E.
G. Berry, Arch.B., (Arch.,'76).
N. W. Cady, Ph.B.
C. W. Candee, B.S.
J. D. Case, B.S.
J. F. Cluck, A.B.
J. H. Comstock, B.S.
F. W. Cooper, Arch.B.
O. H. P. Cornell, C.E.
J. A. Dobroluboff, B.C.E.
W. R. Dudley, B.S., (M.S.,'76).
H. L. R. Fairchild, B.S.
W. R. Fitch, B.C.E.
S. P. Fleming, A.B.
W. H. Flint, A.B.
R. B. Foster, B.C.E., (C.E.,'77).
L. M. Fulton, B.S.
W. Green, B.C.E.
H. M. Gillett, B.S.
T. Hampson, Lit.B.
J. T. Hay, B.S.
B. A. Hayes, Lit.B.
L. T. Henderson, Ph.B.
H. M. Hibbard, B.C.E.
H. L. House, A.B.
J. T. Hurd, B.S.
W. H. Janney, B.C.E,
E. F. P. Jordao, B.C.E.
W. A. Kellerman, B.S.
H. M. Kennedy, Lit.B.
B. W. Law, Arch.B.
C. H. Lay, B.C.E.
W. R. Lazenby, Agr.B.
H. G. Northrup, B.C.E.
J. H. Peirce, B.S.
E. M. Pitts, B.S., (M.S.,'75).
C. A. Preston, B.S.
C. H. Ramsay, B.S.
E. O. Randall, Ph.B.
W. M. J. Rice, Arch.B.
H. B. Robinson, B.C.E.
B. E. Shear, Arch.B.
G. S. Sheppard, B.S.
W. M. Smith, B.S.
W. N. Smith, B.M.E.
C. W. Soulby, B.S.
J. H. Southard, B.S.
A. C. Standart, B.S.
J. L. Stone, Agr.B.
W. Swaty, B.S.
W. P. Thompson, B.S.
L. P. Tier, B.C.E.
S. E. Todd, Arch.B.
F. C. Tomlinson, B.C.E.
G. B. Upham, B.S.
J. D. Upham, B.S.
M. Van Cleef, B.S.
G. R. Van De Water, B.S.
C. W. Wasson, B.C.E.
F. W. Warthorst, B.C.E.
R. H. Wiles, B.S.
G. T. Winston, Lit.B.
C. C. Wood, B.S.
F. C. Wood, B.S.

GRADUATED IN 1875. [52].

W. O. Bates, Ph.B.
A. A. Beattie, B.M.E.
H. P. Bellows, B.S., (M.S.,'79).
E. T. Betts, B.S.
A. R. Bradford, B.S.
A. W. Bulkley, Arch.B.
S. J. Bunting, B.M.E.
C. F. Burt, B.S.
S. W. Carpenter, Ph.B.
I. N. Cook, B.C.E.
E. Corson, B.S.
V. L. Davey, A.B.
J. W. Dean, B.S.
O. W. Ferguson, B.C.E.
G. H. Fitch, B.S.

E. L. B. Gardiner, B.M.E.
E. George, B.C.E.
A R. Gillis, B.M.E.
A. C. Greene, B.C.E.
C. S. Harmon, B.S.
O. Harris, B.S.
F. Hatch, A.B.
F. H. Hiscock, A.B.
D. R. Horton, B.S.
I. E. Hutton, Arch.B.
E. Jackson, B.S.
C. C. King, Arch.B.
H. B. Knight, A.B.
M. H. Ladd, A.B.
M. D. Makepeace, B.C.E.
G. S. Moler, B.M.E.
J. T. Newman, Ph.B.
E. L. Nichols, B.S.
P. H. Perkins, B.C.E.
E. D. Preston, B.C.E.
E. J. Preston, B.S.
H. H. Roberts, Ph.B.
E. K. Rossiter, Arch.B.
H. W. Sackett, A.B.
A. F. Shaw, B.S.
F. W. Simonds, B.S., (M.S.,'76).
F. P. Smith, B.S.
F. P. Stevens, B.S.
W. M. Sturges, Agr.B.
G. Tatnall, B.C.E.
J. J. Thomas, A.B., (A.M.,'76).
G. R. Thompson, B.S.
W. J. Thompson, B.S.
D. J. Tompkins, Ph.B.
V. S. Walsh, B.S.
F. P. Wheeler, B.S.
J. Worthington, A.B.

GRADUATED IN 1876. [65].

J. M. Ashley, B.S.
C. P. Aylen, B.C.E.
C. Barclay, B.S.
C. P. de Barros, B.C.E.
W. J. Berry, A.B.
G. Boardman, B.M.E.
C. T. Brewer, Ph.B.
J. T. Brown, B.M.E.
F. de A. V. Bueno, B.C.E.
J. K. Cady, Arch.B.
C. F. Carpenter, B.M.E.
E. F. Church, B.M.E.
M. R. Conable, B.C.E.
C. B. Coon, B.S.
S. H. Coon, A.B.
E. L. Crandall, B.S.
S. S. Eddy, B.S.
*A. F. Eidlitz, B.C.E.
C. H. Esty, A.B.
W. F. Farmer, B.C.E.
D. F. Flannery, B.S.
C. W. Foote, A.B., M.A., (Ph. D.,'77).
A. W. Foster, A.B., M.A.
E. Frayer, A.B., (A.M.,'77).
M. M. Garver, B.S.
H. McC. Hadley, Arch.B.
F. E. Heath, B.S.
A. Z. Kent, B.M.E.
W. H. Kent, B.S.
F. Looney, B.S.
A. E. Maltby, B.C.E.
W. G. McDowell, A.B.
J. C. McMullen, B.S.
R. L. Moore, B.S.
F. W. Noyes, Ph.B.
L. B. Palmer, B.S.
W. H. Parker, Arch.B.
C. R. Parkhurst, B.S.
J. Parmelee, B.S.
C. W. Raymond, B.C.E.
H. J. Rice, B.S.
W. K. Roy, B.S.
H. A. Rueppele, B.S.
H. Russel, A.B.
C. F. Saunders, Arch.B.
H. B. Seeley, Arch.B.
H. H. Seymour, B.S.
T. Stanton, A.B., (A.M.,'77).
J. H. Stubbs, B.C.E.
J. W. Sturdevant, B.S.
S. P. Sturges, A.B.
W. P. Sturges, B.S.
J. B. Tarleton, Arch.B.
*F. E. Taylor, B.M.E.
H. Terry, B.S.
E. D. Thompson, B.C.E.
H. C. Tilden, B.Lit.

C. A. Van Velzer, B.S.
E. A. Wagner, B.S.
C. E. Washburne, Ph.B.
C. B. Wheelock, B.C.E.
C. H. Willmarth, Agr.B., (M.S., '77).
C. P. Woodruff, B.S.
R. Yatabe, B.S.
F. O. Young, B.S.

GRADUATED IN 1877. [70].

W. C. Ames, B.C.E.
J. Aylen, B.C.E.
A. F. Balch, Arch.B.
C. M. Bean, Agr.B.
J. B. Beatty, B.S.
W. E. Bramhall, B.C.E.
Ida Bruce, A.B.
A. S. Carman, B.S.
P. D. Clark, Ph.B.
C. S. Cobb, B.S.
C. M. Cooper, B.S.
J. S. Coon, B.M.E.
F. D. Crim, B.S.
W. L. Deming, Arch.B.
W. E. Dennis, B.S.
W. R. Dobbyn, Lit.B.
L. Eidlitz, B.M.E.
H. W. Foster, A.B.
A. E. Frota, B.C.E.
S. H. Gage, B.S.
W. Gentleman, B.S.
W. S. Gifford, B.S.
G. W. Gillett, Ph.B.
B. H. Grove, A.B.
M. E. Haviland, B.S.
F. B. Hine, B.S.
L. O. Howard, B.S.
D. W. King, Arch.B.
W. E. Lape, B.M.E.
A. J. Loos, B.S.
W. E. Lucas, Ph.B.
D. J. Macpherson, B.C.E.
C. B. Mandeville, B.S.
L. M. Mann, B.C.E.
A. B. McNairy, B.M.E.
T. L. Mead, B.C.E.
J. S. Milford, B.S.
D. C. Moraes, B.C.E.
C. T. Mould, Arch.B.
I. H. Myers, B.S.
E. O'Niel, Ph.B.
J. N. Ostrom, B.C.E.
F. Outerbridge, B.M.E.
E. H. Palmer, B.S.
F. Patrick, Ph.B.
T. B. Peck, Arch.B.
F. M. Pennock, Agr.B.
H. Russel, (A.B.) Arch.B.
F. V. D. Sanford, B.S.
E. J. Sellew, A.B.
E. D. Sherman, B.S.
W. J. Sherman, B.C.E.
M. J. Sinton, B.S.
E. R. Smith, B.C.E.
S. M'K. Smith, Ph.B.
J. C. H. Stevenson, Ph.B.
H. Thomas, B.C.E.
M. C. Thomas, A.B.
W. B. Throop, B.C.E.
A. S. Tibbets, B.C.E.
H. H. Tyndale, B.S.
E. M. Van Dusen, Lit.B.
D. F. Van Vleet, B.S.
J. Viegas-Munis, B.C.E.
A. L. K. Volkman, Arch.B.
E. L. Ware, B.M.E.
J. S. Waterman, B.M.E.
F. P. Weeks, B.S.
H. S. White, B.S.
C. F. Wilson, Ph.B.

GRADUATED IN 1878. [67].

C. W. Ames, Lit.B.
J. W. Babcock, A.M.
E. Baker, B.S.
F. Baker, B.S.
A. H. Ballard, B.S.
S. T. Ballard, B.S.
P. Barnard, B.S.
W. Beahan, B.C.E.
A. E. Beardsley, B.S.
F. E. Bissell, B.C.E., (C.E., '79)
J. M. Borden, B.M.E.
F. Bruen, B.C.E.
E. Burdsall, B.M.E.

D. W. Cady, A.B.
E. Carey, B.S.
H. Conant, B.S.
C. Crandall, B.S.
S. G. Dewsnap, B.S.
B. B. DeWitt, A.B.
J. Dyson, B.C.E.
G. P. Eaton, B.S.
C. B. Everson, B.S.
A. Falkenau, B.C.E.
L. J. Giddings, B.S.
E. Green, Arch.B.
F. A. Halsey, B.M.E.
E. Hayes, B.C.E.
F. Heermans B.M.E.
M. Hicks, A.B.
J. T. Hill, B.M.E.
G. M. Jarvis, B.C.E.
B. Johnson, B.M.E.
L. F. Jones, B.S.
W. Keith, B.S.
F. M. Kendall, B.S.
J. S. Lehmaier, Ph.B.
F. W. Mann, B.S.
D. Marx, B.C.E.
F. A. Maxwell, B.C.E.,(C.E.,'79).
C. H. McCormick, B.C.E.
K. McEbright, A.B.
W. L. McKay. A.B.
F. O. Meeker, B.S.
T. D. Merrill, B.C.E.
J. Ness, B.S.
M. E. Oliver, Ph.B.
W. B. Pattin, B.S.
W. P. Pickett, B.S.
B. de A. Prado, Agr.B.
E. L. Preston, B.C.E.
R. Putnam, Lit.B.
A. M. Reeves, B.S.
C. M. Rexford, A.B.
Q. N. Ribiero, Arch.B.
F. V. Rodriguez, B.C.E.
W. K. Seaman, B.M.E.
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A. W. Smith, B.M.E.
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H. J. Van Norman, B.S.
A. C. de Vasconcellos, B.M.E.
A.L.K.Volkmann, Arch.B., A.B.
A. C. Wakeley, Lit.B.
W. Weed, B.S.
P. H. Welker, B.C.E.
W. J. Wilcox, B.M.E.

GRADUATED IN 1879. [68].

W. M. Alberti, B.S.
C. N. Blowers, B.S.
E. W. Bradford, B.S.
A. Buchman, Arch.B.
A. Cane, A.B.
W. Chandler, B.S.
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G. A. Dounce, A.B.
W. S. Edwards, B.S.
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H. Gifford, B.S.
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A. S. Hathaway, B.S.
R. Herman, B.C.E.
W. T. Hewett, A.M., Ph.D
L. L. Hill, B.S.
V. N. Hostetler, B.S.
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R. S. Kent, B.S.
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C. O. Lucas, B.S.
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H. Marx, B.M.E.
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A. Millard, B.S.
H. M. Mills, Lit.B.
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L. H. Porter, B.S.
E. C. Russel, A.B.
S. J. Russel, Lit.B.
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J. H. Woodward, B.S.
F. A. Wright, Arch.B.
J. H. W. Young, B.S.

Private Preparatory School.

The Calendar of the Private Preparatory School conducted by Professors MacKoon *and* Wait *is the same as that of the Cornell University, with one term additional beginning in June, on the Wednesday following the annual Commencement of the University.*

Thorough instruction is given, to classes, or to single pupils, in the studies of any of the preparatory courses, and in the Languages and Mathematics required in any of the departments of the University. Inquiries may be addressed to either of the undersigned, Ithaca, N. Y.

B. P. MacKoon. L. A. Wait.

Mr. Kinne's School.

Address
WILLIAM KINNE, A. M.,
ITHACA, N. Y

THE

CORNELL UNIVERSITY

REGISTER

1880-81

ITHACA, N. Y.
PUBLISHED BY THE UNIVERSITY
1881

CONTENTS.

INTRODUCTION.

Foundation of the University.

The existence of Cornell University is due to the bounty of the United States and of Ezra Cornell. On the second of July, 1862, Congress passed an act granting public lands to the several States which should "provide at least one college where the leading object shall be, without excluding other scientific and classical studies and including military tactics, to teach such branches of learning as are related to Agriculture and the Mechanic Arts." Thirty thousand acres for each of its Senators and Representatives in Congress were appropriated to every State; and the share of the State of New York was nine hundred and ninety thousand acres in land scrip.

On the twenty-seventh of April, 1865, the Legislature of this State incorporated "The Cornell University," appropriating to it the income arising from the sale of this land scrip. The most important conditions were, that Ezra Cornell should give to the University five hundred thousand dollars; that it should give instruction in branches relating to Agriculture, Mechanic Arts, and Military Tactics; and that it should receive, without charge for tuition, one student annually from each Assembly District. Mr. Cornell fulfilled the first requirement of the Charter, and made an additional gift of more than two hundred acres of land, with buildings, to be used as a farm in connection with the Department of Agriculture. He also made, afterwards, many other generous gifts to the University.

The Act of Incorporation satisfies the condition of the Congressional grant by providing for instruction in such branches

of learning as are related to Agriculture and the Mechanic Arts, and in Military Tactics, "in order to promote the liberal and practical education of the industrial classes in the several pursuits and professions of life." And it further declares that "such other branches of science and knowledge may be embraced in the plan of instruction and investigation pertaining to the University, as the Trustees may deem useful and proper."

The University, organized in accordance with these requirements of its charter, was duly opened on the seventh of October, 1868.

Trustees.

The number of Trustees, when the Board is complete, is twenty-three. The eldest male lineal descendant of the Founder is, by the law of the State, a Trustee, and seven others, The President of the University, The Governor of New York, The Lieutenant Governor, The Speaker of the Assembly, The Superintendent of Public Instruction, The President of the State Agricultural Society, The Librarian of the Cornell Library.

Of the remaining fifteen two are elected annually by the Trustees and one by the Alumni.

The Faculty.

The Faculty, consisting of professors, resident and non-resident, and assistant professors, is assisted by special instructors and non-resident lecturers. It is divided into the following Special Faculties: Agriculture; Architecture; Chemistry and Physics; Civil Engineering; History and Political Science; Ancient Classical Languages; Germanic Languages; Oriental Languages; Romance Languages; Mathematics; Mechanic Arts; Military Science; Natural History; Philosophy and Letters.

Special Features.

Some of the special features of the University may be briefly stated, as follows:

1. The employment of non-resident professors and lecturers.
2. Liberty in the choice of studies. The student can make his selection from several courses that have been carefully arranged; or he may form for himself an entirely independent

course subject to the approval of the Faculty; or he may dedevote himself, as a special student, to a single department of study. The Faculty, however, while desirous of allowing as much liberty of choice as is practicable, feel it to be a duty to restrain inexperienced students from selections that can only be disadvantageous.

3. The liberal provision made for instruction in those branches of learning that relate to industrial pursuits, and the practical bearing given to the studies in all departments. The variety of instruction enables the student to acquire such knowledge as is likely to agree with his tastes, encourage his aspirations, and promote his work in life.

State Students.

The ninth paragraph of the original Act of Incorporation of the University provides for the admission of one student, annually, from each Assembly District without payment of tuition. The number thus received, if all the scholarships were filled, would be five hundred and twelve. These State Students are to be selected, by yearly competitive examinations, from the various public schools and academies of the State. It is the duty of the School Commissioners or Board of Education to give the members of the public schools under their care the opportunity of competing. No applicant is allowed to compete who has been admitted to the University; and in order to enter the University, the successful candidate is subject to the same requirements in regard to scholarship as any other applicant. As the law requires the selection of "the best scholar," no distinction on account of sex is recognized in the competition.

Resident Graduates.

The University does not contemplate any immediate movement in the direction of founding professional schools in Divinity, Law, or Medicine; but it has provided for the wants of those who have taken their first or Baccalaureate Degree, and wish to continue general studies or those subsidiary to scientific and professional pursuits. For such purposes its Library, Museums, Laboratories, and Lecture-rooms are open to its own graduates and graduates of like standing from other colleges and universities.

Advanced Degrees have been provided for these students, which, however, can be taken only on condition that the preparatory work has been fully and faithfully performed. Any student intending to take an advanced degree must announce his intention immediately on becoming a Resident Graduate, and place himself under the advice of the appropriate professor or special faculty. It is not necessary, however, that each student pursuing graduate studies should be a candidate for any second degree. He may enter the University for a longer or a shorter time, and pursue any branch of study and investigation.

Higher Education of Women.

It was the wish, from the first, of the Founder and other influential friends of the University, that it should be open to all, without regard to sex, color, or nationality. By an act of the Trustees, passed in April, 1872, women are admitted to the University on the same terms and conditions as men, except that they must be seventeen years old. A separate building, the Sage College, offers a residence for those who prefer to live together rather than in private families. There is no separate course or department for women students, the entrance examinations and all the studies, except Military Science, being the same for them as for the young men.

Religious Instruction.

The University, established by a government which recognizes no distinctions in religious belief, would be false to its trust were it to seek to promote any creed, or to exclude any. The State of New York, in designating it as the recipient of the bounty of the United States Government, acted on this principle. By the terms of its charter, persons of any religious denomination or of no religious denomination are equally eligible to all offices and appointments in the University, and it is expressly ordered that "at no time shall a majority of the board of Trustees be of any one religious sect, or of no religious sect."

In the University Chapel—the gift of Henry W. Sage—religious services are held, and discourses delivered by representative clergymen of the various Christian denominations.

CALENDAR.

First Term, 1880.

September 14,	*Tuesday*,	Entrance Examinations begin.
September 16,	*Thursday*,	Registration Day.
September 17,	*Friday*,	Instruction begins.
November 25,	*Thursday*,	THANKSGIVING.
December 13,	*Monday*,	Term Examinations begin.
December 17,	*Friday*,	Term ends.

Second Term, 1881.

January 4,	*Tuesday*,	Entrance Examinations begin.
January 6,	*Thursday*,	Registration Day.
January 7,	*Friday*,	Instruction begins.
January 11,	*Tuesday*,	FOUNDER'S DAY.
February 22,	*Tuesday*,	WASHINGTON'S BIRTHDAY.
March 4,	*Friday*,	Woodford Prize Competition.
March 21,	*Monday*,	Term Examinations begin.
March 25,	*Friday*,	Term ends.

Third Term, 1881.

April 2,	*Saturday,*	Registration Day.
April 4,	*Monday,*	Instruction begins.
May 16,	*Monday,*	Commencement Essays presented.
May 25,	*Wednesday,*	Theses for Advanced Degrees presented.
May 30,	*Monday,*	DECORATION DAY.
May 31,	*Tuesday,*	Senior Examinations begin.
May 31,	*Tuesday,*	Examinations for Second Degrees begin.
June 6,	*Monday,*	Term Examinations begin.
June 10,	*Friday,*	Term Examinations end.
June 13,	*Monday,*	Entrance Examinations at Ithaca begin.
June 14,	*Tuesday,*	Entrance Examinations at Chicago, Cleveland, and Boston begin.
June 14,	*Tuesday,*	Class Day.
June 15,	*Wednesday,*	Alumni Day. Annual Meeting of the Trustees.
June 16,	*Thursday,*	COMMENCEMENT.

First Term, 1881.

September 13,	*Tuesday,*	Entrance Examinations begin.
September 15,	*Thursday,*	Registration Day.
September 16,	*Friday,*	Instruction begins.

UNIVERSITY OFFICERS.

Board of Trustees.

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ALFRED STEBBINS, A.M., 110 *N. Aurora St.*
Assistant Professor of South European Languages.

LUCIEN AUGUSTUS WAIT, A.B., *University Grounds.*
Associate Professor of Mathematics.

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Professor of the Greek Language and Literature.

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Curator of the Newcomb Collection of Shells.

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MILES LORIN CLINTON, 17 *W. Buffalo St.*
Foreman of the Machine Shop.

ALBERT FRANKLIN MATTHEWS, 43 *N. Univ. Building.*
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Janitor.

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Watson, George Catchpole,	Clyde,	*Agriculture*
Wendell, Henry Ten Eyck,	Chicago,	*Architecture*
Wick, Richard Brown,	Pittsburg, Pa.,	*Engineering*
Wightman, Willard Humphrey,	Hastings,	*Engineering*

Wilson, Frank Thomas,	Corry, Pa.,	*Science and Letters*
Winegar, Harry Philips,	San Francisco, Cal.,	*Optional*
Wing, Henry Hiram,	Willow Brook,	*Agriculture*
Withington, Alfreda Bosworth,	South Amboy, N. J.,	*Arts*

Juniors.

Adams, John Davis,	Plainville,	*Literature*
Ayers, Mary Frances,	Ithaca,	*Literature*
Baker, Clarence Albert,	Yaphank,	*Medical Preparatory*
Beebe, George,	Penn Yan,	*Science and Letters*
Biscoe, Helen Maria,	Keene, N. H.,	*Hist. & Polit. Sc.*
Blachstein, Arthur,	New York City,	*Med. Preparatory*
Bowen, Anna Cornelia,	Batavia,	*Arts*
Brown, Ellen Coit,	Ithaca,	*Science and Letters*
Brown, Frederick Lord,	Sag Harbor,	*Architecture*
Brunn, Armin Earnest,	Brooklyn,	*Agriculture*
Buckland, Benjamin Isaac Coman,	Port Byron,	*Med. Preparatory*
Carlson, Eleanore Frederica,	Owego,	*Literature*
Carpenter, Calvin,	Troy,	*Hist. & Polit. Sc.*
Casey, Patrick Joseph,	Binghamton,	*Arts*
Catlin, Frederick Miles,	Erie, Pa.,	*Arts*
Chester, Frederick Dixon,	St. Louis, Mo.,	*Sc. and Letters*
Coe, Alfred Byron,	Oswego,	*Science and Letters*
Cole, Chester Glen,	Corning,	*Literature*
Collins, Homer,	Rochester,	*Natural History*
Corbett, Flora Josephine,	Clayville.	*Arts*
Cowell, Alexander Tyng,	Erie, Pa.,	*Literature*
Cowles, Alfred Hutchinson,	Cleveland, O.,	*Chem. & Physics*
Curtis, Ida Maynard,	Boston, Mass.,	*Sc. and Letters*
Cushing, Harry Platt,	Cleveland, O.,	*Philosophy*
Dibble, Henry Montgomery,	Marshall, Mich.,	*Literature*
Fairchild, Tracy Rasselas,	Ovid,	*Engineering*
Fay, Lewis George,	Burlington,	*Arts*
Fowler, Mary,	Gouverneur,	*Science and Letters*
Gardiner, William Frederick,	Fort Covington,	*Med. Preparatory*
Gill, Francis Beaman,	Antwerp,	*Science and Letters*
Grant, Edith,	New York City,	*Philosophy*

Harding, William Elias,	Bethany,	*Agriculture*
Hiscock, Albert King,	Syracuse,	*Arts*
Holman, Julian,	Bolton, Mass.,	*Agriculture*
Horr, Norton Townshend,	Wellington, O.,	*Sc. and Letters*
Horr, Rollin Cortland,	Wellington, O.,	*Sc. and Letters*
Kenney, Eudorus Catline,	Truxton,	*Mathematics*
Kent, William Archie,	Oil City, Pa.,	*Science and Letters*
Krüsi, Hermann,	Oswego,	*Engineering*
Leary, Frank,	Ithaca,	*Science and Letters*
Luckey, Frank Ranney,	Poughkeepsie,	*Sc. and Letters*
Lyon, John,	Schuylerville,	*Hist. & Polit. Sc.*
McClelland, Robert Watson,	Pittsburg, Pa.,	*Sc. and Letters*
Oatley, Eugene Lyman,	Utica,	*Medical Preparatory*
Pierce, Daniel Addison,	Baldwinsville,	*Philosophy*
Purdy, Markwell Seward,	Corning,	*Philosophy*
Putnam, Mary Chastina,	Ellington,	*Literature*
Rackemann, Felix,	Lenox, Mass.,	*Science and Letters*
Rappleye, Walker Glazier,	Minetto,	*Science and Letters*
Reed, Charles,	Senaju, Guatemala,	*Sc. and Letters*
Reed, Jared Ackerson,	Ontario,	*Science and Letters*
Robie, Harry Adams,	Marathon,	*Mechanic Arts*
Roberts, Willis Markel,	Seneca Falls,	*Mechanic Arts*
Rœhrig, Fred Lewis,	Ithaca,	*Architecture*
Sazé, Hidesabro,	Wahamatsu, Japan,	*Agriculture*
Schenck, Herbert Dana,	Union Springs,	*Natural History*
Sears, Stephen Parrish,	Buffalo,	*Literature*
Shiras, Winfield Kennedy,	Pittsburg, Pa.,	*Sc. and Letters*
Smith, Hermon Woodworth,	Trumansburg,	*Science and Letters*
Smith, Isaac Parshall,	Ithaca,	*Arts*
Smith, Joseph Lesley,	Canajoharie,	*Science and Letters*
Soper, Grace Weld,	Waltham, Mass.,	*Arts*
Streeter, Howard Malcom,	Tunkhannock, Pa.,	*Arts*
Suydam, Frederick,	Baldwinsville,	*Mechanic Arts*
Thompson, Madeleine Sylvester,	Passaic, N. J.,	*Sc. and Letters*
Trumbull, William,	Sandy Hill,	*Engineering*
Tuthill, James Fred,	Corning,	*Arts*
Van Pelt, Elizabeth Vredenburgh,	Trumansburg,	*Sc. and Letters*
Van Rensselaer, John,	Ithaca,	*Arts*
Wait, John Cassan.	Norwich,	*Engineering*

Waldo, Gerald,	Scotland, Conn.,	*Agriculture*
Webster, John Gurdon,	Bath,	*Natural History*
Wilcox, Asa Stearns,	East Minneapolis, Minn.,	*Sc. and Letters*
Wilson, Dora Frank,	Ithaca,	*Science and Letters*
Woodard, James Allen,	Elma,	*Science and Letters*
Wright, George Herdman,	Buffalo,	*Arts*
Yeaw, Everett,	Lawrence, Mass.,	*Arts*

Sophomores.

Alling, Asa Alling,	Bangall,	*Science and Letters*
Anderson, Charles Henry,	Griggsville, Ill.,	*Literature*
Avery, Charles Irving,	Auburn,	*Science and Letters*
Avery, James Carrington,	Auburn.	*Science and Letters*
Ayres, Philip Wheelock,	Villa Ridge, Ill.,	*Optional*
Badger, Theodore,	Ithaca,	*Agriculture*
Baker, Leslie Arthur,	Olean,	*Agriculture*
Baum, Josephine,	Syracuse,	*Science and Letters*
Beye, John Charles,	Elgin, Ill.,	*Science*
Biggs, Herman Michael,	Trumansburg,	*Arts*
Booth, Irving Edward,	Rochester,	*Mechanic Arts*
Boulton, Jessie Mary,	Oil City, Pa.,	*Literature*
Boyer, Jerome Webster,	Freeport, Ill.,	*Agriculture*
Brainard, George Austin,	Higganum, Conn.,	*Sc. and Letters*
Brownell, Hart Murray,	Nyack,	*Engineering*
Bullock, George,	Cincinnati, O.,	*Mechanic Arts*
Burpee, George Herbert,	Sauquoit,	*Mechanic Arts*
Carson, William,	St. Paul, Minn.,	*Hist. & Polit. Sc.*
Chase, Charles Curry,	Schenevus,	*Literature*
Cobb, William Howard,	Andover,	*Agriculture*
Countryman, Charles Edwin,	Albany,	*Hist. and Polit. Sc.*
Crooker, Edward Henry,	Minneapolis, Minn.,	*Literature*
Curtis, Charles Locke,	Newfield,	*Arts*
Cushing, Edward Fitch,	Cleveland, O.,	*Philosophy*
Diefendorf, Mary Riggs,	Brooklyn,	*Arts*
Dix, John Alden,	Glens Falls,	*Science*
Dowling, Eunice,	Bradford,	*Arts*
Duryea, Edwin,	Craigsville,	*Engineering*

Dwellé, William Delafield,	Penn Yan,	*Arts*
Eaton, William Moser,	Ithaca,	*Philosophy*
Ehrman, Harry,	Decatur, Ill.,	*Science and Letters*
Elmer, Herbert Charles,	Rushford,	*Arts*
Ewing, William Bion,	Huntington, Ind.,	*Engineering*
Failing, Milton,	Rexville,	*Science and Letters*
Fraser, James,	Johnstown,	*Science and Letters*
Freeman, Walter Jackson,	Philadelphia, Pa.,	*Nat. History*
Fuertes, James Hillhouse,	Ithaca,	*Engineering*
Handy, Ella Marie,	Schoharie,	*Optional*
Hoffman, Harry Natt,	Elmira,	*Optional*
Holton, Frederick Arthur,	Washington, D. C.,	*Chem. & Physics*
Humphries, John Henry,	Syracuse,	*Literature*
Ingersoll, George Talcott,	Cleveland, O.,	*Mechanic Arts*
Jacobs, Townsend Herbert,	Ithaca,	*Architecture*
Kelley, Charles Wallace,	Albany,	*Mechanic Arts*
Kerr, Milton Royce,	Mongaup Valley,	*Science*
Lillis, Thomas Francis,	Coventryville,	*Mechanic Arts*
Longwell, Harry Edgar,	Monongahela, City, Pa.,	*Mechanic Arts*
Mapes, Arlington,	Rushville,	*Optional*
Marshall, Holmes,	Cleveland, O.,	*Arts*
Matthews, Albert Franklin,	Orange, N. J.,	*Optional*
Maxwell, Emma Eliza,	North Clymer,	*Sc. and Letters*
McGraw, DeWitt Hiram,	Binghamton,	*Arts*
Nash, Horace Woodworth,	Ithaca,	*Medical Preparatory*
Odell, Albert,	Bloomville,	*Engineering*
Page, William Henry,	Stafford,	*Engineering*
Patterson, Roswell Henry,	Herrick Centre, Pa.,	*Sc. and Letters*
Payne, Lewis Taber,	Tonawanda,	*Sc. and Letters*
Pearson, Edward,	Sedalia, Mo.,	*Engineering*
Pease, Henry Hale,	Syracuse,	*Optional*
Place, Edwin,	Cincinnatus,	*Engineering*
Potter, Bina Abigail,	Ithaca,	*Optional*
Pratt, John Lovejoy,	Buskirk's Bridge,	*Science and Letters*
Prentiss, Evarts Lincoln,	Penn Yan,	*Literature*
Preswick, Eugene Henry,	Ithaca,	*Science and Letters*
Prosser, Charles Smith,	Brookfield,	*Science and Letters*
Raynor, George Cartwright,	Riverhead,	*Science and Letters*
Reed, James William,	Warrensburg,	*Engineering*

Root, Daniel Bayard,	Port Byron,	*Literature*
Rhodes, Frances,	Trempealeau, Wis.,	*Architecture*
Rüdiger, John Max,	Brooklyn,	*Mechanic Arts*
Ruggles, William Benjamin,	Bath,	*Mechanic Arts*
Runyon, Frank Willets,	Plainfield, N. J.,	*Literature*
Searing, Byron Hudson,	Sherwood,	*Science*
Serat, Seth Swift,	Elmira,	*Science and Letters*
Sheldon, Daniel Corydon,	Delphi,	*Engineering*
Shorter, Thomas Jay,	Aurora,	*Agriculture*
Smith, Delano Eugene,	New York City,	*Sc. and Letters*
Smith, John Campbell,	Cleveland, O.,	*Mechanic Arts*
Southwick, John Leonard,	Bombay,	*Science and Letters*
Stevenson, George Edward,	Clark's Green, Pa.,	*Agriculture*
Sullivan, Frank Robert,	Pompey Centre,	*Philosophy*
Sweet, Vaughn Charles,	Phœnix,	*Mechanic Arts*
Thayer, George Henry,	Plymouth, Ind.,	*Philosophy*
Tinsley, Henry Greenwood,	Lyons,	*Optional*
Tomkins, Walter,	Newark, N. J.,	*Sc. and Letters*
Turner, Ebenezer Tousey,	Ithaca,	*Engineering*
Washburn, Frank Sherman,	Chicago, Ill.,	*Engineering*
Welby, Arthur Adlard,	Rio de Janeiro, Brazil,	*Mechanic Arts*
Wetherell, Jane Johnson,	Philadelphia, Pa.,	*Sc. and Letters*
Wheeler, William Murray,	Breesport,	*Philosophy*
Whitney, Harry Leroy,	Plymouth, Pa.,	*Sc. and Letters*
Wilcox, Fred Clarence,	Ithaca,	*Arts*
Wilcox, Fred Elmer,	Ithaca,	*Agriculture*
Woodruff, Cora Eliza,	Ithaca,	*Arts*
Yost, Florence Lincoln,	Corry, Pa.,	*Science and Letters*

Freshmen.

Aiken, George David,	Tioga, Pa.,	*Science and Letters*
Aldrich, Herbert Lincoln,	New York City,	*Literature*
Avila, Arao Ferreira de,	San Paulo, Brazil,	*Mechanic Arts*
Bassett, Emma Neal,	Cooper's Plains,	*Philosophy*
Bell, Maud,	Chester, N. H.,	*Optional*
Bering, Wilson Morrison,	Decatur, Ill.,	*Science and Letters*
Brewster, Charles Albert,	Addison,	*Science and Letters*

Brown, Julia Wells,	Holland Patent,	*Optional*
Burrows, James Bering,	Decatur, Ill.,	*Science and Letters*
Cahn, Benjamin Robert,	Chicago, Ill.,	*Optional*
Campbell, Daniel Alexander,	Fort Wayne, Ind.,	*Engineering*
Carmalt, Edward,	Punxsutawney, Pa.,	*Science and Letters*
Carpenter, Fred Wisner,	Owego,	*Engineering*
Carpenter, George,	Waverly, Pa.,	*Agriculture*
Carter, William Alexander,	Fort Bridger, W. T.,	*Hist. & Polit. Sc.*
Case, Howard Emmet,	Fulton,	*Science and Letters*
Cassedy, William Fraser,	Newburg,	*Philosophy*
Chisholm, Charles Fillmore,	Chazy,	*Optional*
Cobb, Alice Ellen,	Andover,	*Optional*
Coimbra, Anastacio Rodrigues de Aquino,	Trez Ilhas, Brazil,	*Mechanic Arts*
Cole, Edward Marcus,	Newnan, Ga.,	*Mechanic Arts*
Cole, Frank Barto,	Newnan, Ga.,	*Mechanic Arts*
Coles, Franklin Albert,	Glen Cove,	*Science and Letters*
Collmann, Onnie Janssen,	Freeport, Ill.,	*Science and Letters*
Coman, Charles Walter,	Kankakee, Ill.,	*Sc. and Letters*
Copley, Allen Enos,	Chaumont,	*Science and Letters*
Cornell, Ida,	Central Valley,	*Optional*
Cowles, Lewis Hutchinson,	Cleveland, O.,	*Philosophy*
Crandall, George Hazard,	Almond,	*Agriculture*
Curnow, George Trevilyan,	Brooklyn,	*Engineering*
Dann, Clarence Burdette,	New Haven, Conn.,	*Engineering*
Davidson, George Bruce,	Scranton, Pa.,	*Agriculture*
Davol, Joseph Benjamin,	Chicago, Ill.,	*Engineering*
DeForest, Harry Pelouze,	Fulton,	*Science and Letters*
Ditmars, George Ford,	Ovid Centre,	*Hist. and Polit. Sc.*
Drury, John Maynerd,	Vail's Mills,	*Science and Letters*
Du Bois, William,	Great Bend, Pa.,	*Mechanic Arts, Special*
Ensign, Orville Hiram,	Ithaca,	*Mechanic Arts*
Farrington, Charles Lincoln,	Trumansburg,	*Arts*
Fish, Fred Starr,	Cedarville,	*Science and Letters*
Freeman, William Neely,	Sherburne,	*Arts*
Gage, Maud,	Fayetteville,	*Literature*
Gambee, Linnie,	Ithaca,	*Science and Letters*
Gilbert, Sarah Hughes,	Buckingham, Pa.,	*Mathematics*
Goodman, Maurice Hugo,	Chicago, Ill.,	*Optional*

Grotecloss, Hattie Elizabeth,	New York City,	*Natural History*
Gwynne, Edmiston,	Columbus, O.,	*Sc. and Letters*
Haldeman, Frank Mackenzie,	Cleveland, O.,	*Chemistry, Special*
Hamilton, Alexander,	San Francisco, Cal.,	*Optional*
Hamilton, William Vallance,	Caledonia,	*Optional*
Hasbrouck, Charles Alfred,	Ithaca,	*Engineering*
Hettinger, Mathias,	Freeport, Ill.,	*Sc. and Letters*
Hillger, Samuel Ernest,	New Orleans, La.,	*Architecture*
Hoefler, John Lincoln,	Ilion,	*Mechanic Arts*
Horton, Howard Lispenard,	City Island,	*Science and Letters*
Howard, William Turner,	New York City,	*Sc. and Letters*
Howland, Herbert Slocum,	Sherwood,	*Architecture*
Hufcutt, Ernest Wilson,	Afton,	*Science and Letters*
Ingalls, Frank Percy,	Salem, Mass.,	*Chemistry and Physics*
Jones, Anna Lizzie,	Trumansburg,	*Philosophy*
Jones, Charles Sumner,	Middlesex,	*Science and Letters*
Knap, William Herschel,	Niantic, Ill.,	*Science and Letters*
Knowles, Wilbur Stoddard,	Pennington, N. J.,	*Arch., Special*
Krauss, William Christopher,	Attica,	*Science and Letters*
Lapham, Ludlow Eliakim,	Penn Yan,	*Arts*
Larned, William Henry,	Poland,	*Engineering*
Law, John Edwin,	Ithaca,	*Optional*
Levi, Louis Eleazer,	Buffalo,	*Chem. and Physics*
Lewis, George Washington,	Buffalo,	*Arts*
Linn, William Walton,	Decatur, Ill.,	*Science and Letters*
Maguire, Edward,	Seward,	*Science and Letters*
McLallen, James Grover,	Trumansburg,	*Science and Letters*
McLennan, Roderick,	Elgin,	*Philosophy*
McLoughlin, James,	New York City,	*Optional*
McMillan, Frank,	Buffalo,	*Hist. and Polit. Sc.*
Miller, Emily,	Waverly, Pa.,	*Science and Letters*
Monroe, Elmon,	Silver Creek,	*Arts*
Murphy, Edward Charles,	Phœnix,	*Engineering*
Norton, Charles David,	Elmira,	*Mechanic Arts*
Oakes, Helen Mar,	Steuben,	*Optional*
Olin, Fred,	Perry,	*Mechanic Arts*
Overton, Floyd Carter,	Belleville,	*Philosophy*
Paddock, Fred Gore,	Malone,	*Science and Letters*
Patchin, Frank Glines,	Wayland,	*Science and Letters*

Penny, George Barlow,	Haverstraw,	*Science*
Phelps, Henry Samuel,	Morrisville,	*Optional*
Potter, Charles Anson,	Alpine,	*Science and Letters*
Poucher, Warren Allen,	Oswego,	*Mechanic Arts*
Randolph, Cyrus,	Decatur, Ill.,	*Literature*
Reno, Robert Ross,	Harrisburg, Pa.,	*Engineering*
Robinson, Clarence Isaac,	Mt. Vision,	*Chem. and Physics*
Rose, Hudson Parmelee,	Cleveland, O.,	*Literature*
Russell, Ernest Emory,	Havana,	*Engineering*
Schwerdtfeger, Ernest,	Galveston, Tex.,	*Mechanic Arts*
Scofield, Frank Graham,	Fishkill,	*Engineering*
Seymour, Ralph Crysler,	Ogdensburg,	*Mechanic Arts*
Shaler, Ira Alexander,	New York City,	*Sc. and Letters*
Sibley, Herbert Delano,	Randolph,	*Optional*
Skillicorn, John Henry,	Albany,	*Natural History*
Sloan, Fred,	Worcester,	*Philosophy*
Smith, Charlotte,	Smith's Mills,	*Philosophy*
Smith, James Archibald,	Ithaca,	*Philosophy*
Spurr, Marcia Edith,	South Edmeston,	*Science and Letters*
Stambaugh, John Tod,	Youngstown, O.,	*Optional*
Story, Elmer Gildersleeve,	Schultzville,	*Science and Letters*
Taber, Lucretia Hathaway,	New Bedford, Mass.,	*Arts*
Thorp, Charles Monroe,	Oil City, Pa.,	*Philosophy*
Vaughan, James Frye,	Springville,	*Optional*
Van Dusen, Gertrude Frances,	Geneva,	*Arts*
Van Ostrand, Byron Dean,	Marion,	*Science and Letters*
Van Sickle, John,	Cayuga,	*Optional*
Walch, Charles John,	Syracuse,	*Science and Letters*
Ware, Richard,	Washington, D. C.,	*Optional*
Waring, John,	Ovid,	*Mechanic Arts*
Webb, Walter Loring,	Cortland,	*Engineering*
Weed, Oscar Dillwyn,	North Rose,	*Arts*
Welles, Nelson Ackley,	Elmira,	*Agriculture*
Wheeler, Amos,	Ithaca,	*Optional*
Williams, Timothy Shaler,	Ithaca,	*Arts*
Wilson, Charles Bundy,	Geddes,	*Arts*
Wilson, Edward Fay,	Ithaca,	*Agriculture*
Wisewell, Frank Wilson,	Ithaca,	*Mechanic Arts, Special*
Wright, Horton,	Hoosick Falls,	*Science and Letters*
Wyckoff, James Newton,	Perry,	*Optional*

Summary by Years.

Resident Graduates	14
Seniors	89
Juniors	77
Sophomores	95
Freshmen	124
	399

Summary by Courses.

Courses.	Seniors.	Juniors.	Soph.	Fr.	Total.
Agriculture	9	5	7	5	26
Architecture	1	2	2	3	8
Arts	19	13	10	10	52
Chemistry and Physics	—	1	1	4	6
Civil Engineering	10	4	12	12	38
History and Political Science	—	3	2	3	8
Literature	5	8	8	4	25
Mathematics	2	1	—	1	4
Mechanic Arts	4	3	12	14	33
Medical Preparatory	—	5	1	—	6
Natural History	3	3	1	2	9
Philosophy	4	3	5	10	22
Science	3	—	4	1	8
Science and Letters	28	25	22	35	110
Optional	1	1	8	20	30
Undergraduates	89	77	95	124	385
Resident Graduates					14
Total					399

ADMISSION.

Entrance Examinations.

I.

The Primary Examination for Admission to the University.

All candidates for admission, except those provided with certificates or diplomas as specified below, are examined as follows :

1. In *English Grammar*, including Orthography and Syntax.
2. In *Geography*, political and physical.
3. In *Physiology*.
4. In *Arithmetic*, including the Metric System; *Algebra*, through Quadratic Equations, and including Radicals and the Theory of Exponents; and *Plane Geometry*.

In place of these examinations Certificates or Diplomas are received as follows:

(*a*) *Regents' Certificates* issued by the Regents of the State of New York are accepted instead of the examinations in Arithmetic, Geography, and English Grammar.

(*b*) Certificates issued by the Superintendent of Public Instruction of the State of New York, Diplomas issued by the State Normal Schools, and by those Academies and High Schools of the State of New York whose requirements for graduation have been approved by the Faculty, and whose course of study requires Physiology and Plane Geometry, are accepted instead of the examinations in all the subjects named above *except Algebra.*

(*c*) Diplomas issued by the Regents to graduates from the High Schools and Academies of the State of New York are accepted instead of the examinations in all the subjects named.

Candidates must be of good moral character and at least *sixteen* years of age, or, if women, *seventeen.*

II.

Examinations for Admission to the Courses.

The requirements for admission to the Courses in *Agriculture*, *Architecture*, *Civil Engineering*, and *Mechanic Arts*, are the same as those for admission to the University ; but for admission to any of the other regular Courses of Study, the requirements, *in addition to the Primary Examination*, are as stated below.

To the Courses in Science, Science and Letters, Mathematics, and Chemistry and Physics.

In addition to the Primary Examination, an examination in *any one* of the following sets of subjects:

The principles of French Grammar, the translation of English into French, and three books of Voltaire's Charles XII, or its equivalent;

Or, The whole of Whitney's German Grammar, translation of German at sight, the translation of English into German, and one hundred pages of Whitney's Reader, including two of the longer prose extracts or an equivalent;

Or, Algebra entire (*any of the larger ones*). Solid Geometry, including Conic Sections, and Trigonometry, Plane and Spherical.*

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* Treating the trigonometrical functions as ratios; as in Todhunter, Peirce, Chauvenet, Wheeler, and Greenleaf.

To the Course in Natural History and the Two Years Course Preparatory to the Study of Medicine.

In addition to the Primary Examination, examinations as follows:

In French or German as above; in Plane Trigonometry; in Latin four books of Cæsar's Commentaries, or some equivalent, with an adequate amount of grammatical knowledge; and in Greek the alphabet and enough of the language to enable the student to recognize, analyze, and form scientific technical terms.

To the Courses in Literature and Philosophy.

In addition to the Primary Examination, examinations as follows:

In French, or German, or advanced Mathematics (as above), and in Latin (as below).

To the Course in Arts.

In addition to the Primary Examination, examinations in Greek and Latin.

I. Greek.—Candidates are expected to have read at least one hundred pages of Attic prose, and three books of Homer: they are examined (1) critically on what they have read, (2) in translating easy Greek at sight, (3) in translating English into Greek, and (4) on the History of Greece, to the death of Alexander.

II. Latin.—Candidates are examined upon (1) the following authors, with questions on subject-matter, constructions, and the formation and inflection of words: Cæsar, four books of the Gallic War, Virgil, the Eclogues and six books of the Æneid (with the prosody), Cicero, six Orations, including the four against Catiline; (2) the translation at sight of passages of average difficulty from Cæsar and Cicero; (3) the translation into Latin of a piece of connected English based upon the principles and

vocabulary contained in the first forty lessons of Allen's "Introduction to Latin Composition"; (4) the outlines of Roman History and Ancient Geography (Leighton's "History of Rome" will indicate the amount and method of study desired).

Admission to Special Departments.

Special Students are admitted without examination, by a vote of the Faculty, to any of the Departments in which either laboratory work or drafting is required, on the recommendation of the professor in charge of the department. Such students must be at least twenty-one years of age, and must have satisfactory attainments in the subject they intend to pursue; they are required to devote at least fifteen hours a week to the work of the department which they have entered, and to renew their application for admission at the end of each year.

Admission to Advanced Studies.

Candidates for admission to advanced studies in any course are required to pass, *in addition to the Entrance Examinations* for that course, examinations in the work already performed by the classes which they design to enter.

Candidates from Other Colleges.

Certificates of honorable dismissal from other colleges are received in place of the *Primary Examination* only, and when offered by those who *have passed at least one term's examinations* at the institution grant-

ing such dismissal. No person, whether from another college or not, is admitted to *advanced* studies except after examinations as above stated.

Admission to Graduate Study.

Students are admitted to graduate study after having taken a Baccalaureate degree in this University, or on presenting the diploma of any equivalent degree conferred elsewhere; they are at liberty to attend lectures, recitations, or other exercises of undergraduates, and to use the Library, Museums, etc. They are expected to pursue some study of advanced character under the direction of a professor or a special faculty.

DEPARTMENTS AND SPECIAL COURSES OF STUDY.

AGRICULTURE.

I. *APPLIED AGRICULTURE.*

The requirements for admission to the Course in Agriculture are such as to put the advantages which it offers within the reach of every young man who has made good use of the instruction afforded in the public schools.

The instruction is given by lectures and recitations, illustrated with the aid of the Auzoux models and various other collections belonging to the University. Besides the class-room exercises, the student devotes as much time as can be spared to practice in the botanical, chemical, and veterinary laboratories, as well as in the fields and barns.

In Applied Agriculture five hours weekly during the *Fourth Year* are devoted to technical instruction in all its leading and most of its minor branches. The students are also required to spend three hours a day, two days in each week, in field practice, and in the handling and feeding of domestic animals; and if this amount of practice does not prove sufficient to make each student expert in the various operations of the farm, additional time is required during the summer vacation.

The instruction by lectures begins with the *Fourth Year* and continues through three terms. First Term: Wheat, culture, varieties, preparation of the soil, seeding, injurious insects, harvesting, threshing, and marketing; Swine, the history of breeds, feeding, diseases, general management, and piggeries; Farm Buildings, location plans, material, construction, repairs and preservation, contracts and liabilities of contractors; Fields, shape and size; Fences and Gates, construction, number, kind, repairs, and durability of woods used; Farm and Public Roads, bridges and culverts, location, construction, and repairs; Farms, their selection and purchase with regard to (1) remoteness or nearness to markets, (2) agricultural capabilities, (3) roads, (4) improvements, (5) schools and society, titles, deeds, judgments, and mortgages; Farm-yard Manures, their composition, manufacture, preservation, and application; Commercial Fertilizers, composition, application, and utility; Farm Accounts begun. Second Term: Farm Accounts completed; Principles of Stock-breeding, law of similarity, of variation as caused by food, habit, and climate, atavism, relative influence of male and female, prepotency, sex, in-and-in breeding, crossing and out-crossing, grading up or breeding in line; Races and Breeds, pedigrees, leading breeds of neat animals treated as to history, markings, characteristics, and adaptation to uses, soil, climate, and locality; Breeding, feeding, and management of cattle; Butter, cheese, and milk dairies, and beef production; Sheep Husbandry treated in detail same as cattle. Third Term: The Horse, breeds and breeding, education, care, driving, and stables; Farm Drainage, mapping of drains, material, construction, and utility; Plows and plowing; Farm Implements and machinery, use, care, and repairs; Corn, oat, barley, and flax culture; Grasses and forage plants; Weeds and their eradication; Business Customs, rights, and privileges; Notes, contracts, and obligations; Employment, and direction of laborers.

The University Farm consists of 120 acres of arable land, the larger part of which is used for experimental purposes and the illustration of the principles of Agriculture. Nearly all the domestic animals are kept to serve the same ends. Those portions of farm and stock not used for experiments, are managed with a view to their greatest productiveness. Statistics of

both experiments and management are kept on such a system as to show at the close of each year the profit or loss not only of the whole farm but of each crop and group of animals. Of the two barns with which the farm is equipped, one is largely devoted to the needs of the Horticultural Department; the other, containing steam-engine, feed-cutter, stationary thresher, and other necessary appliances, furnishes accommodation for the general crops and stock, and for experimental work.

II. *AGRICULTURAL CHEMISTRY.*

The study of Agricultural Chemistry comprises lectures, and analytical practice in the laboratory. The lectures, one hundred and eleven in number, embrace the following general subjects:

The general principles of chemical science, accompanied by introductory laboratory practice; the chemistry of the elements and their compounds that constitute soils, plants, and animals; agricultural chemical investigators and their methods and means of working, and the literature of agricultural chemistry; the chemistry of vegetable life, and the production of vegetable substance in general; the physical and chemical properties and agricultural resources of the soil; tillage, drainage, etc., and amendments and manures; the composition of crops and other materials used for fodder; animal chemistry and nutrition; fermentation and putrefaction; milk and its manufactured products and residues; food, and water and air in their relations to human and animal life; the chemical analysis of fodder and food; and farm crops and their manufactured products and residues.

The analysis of agricultural materials and products is treated in a course of chemical practice, as described under the head of Analytical Chemistry, page 57.

III. *ECONOMIC ENTOMOLOGY.*

Twenty lectures upon this subject are given in the Third Term.

The course presents the characteristics of the orders of insects, the more important families, and the species which are injurious.

beneficial, or otherwise especially interesting. The lectures are illustrated by specimens of the stages and works of insects, and due prominence is given to the practical treatment of forms having an economic importance.

In the laboratory and field practice students are instructed in all kinds of practical entomological work, involving drawings and notes of observations, with methods of collecting, breeding, destroying, preserving, arranging, etc.

IV. *HORTICULTURE.*

In this department lectures and recitations in the class-room are supplemented by practice in the laboratory, gardens, and orchards.

The instruction begins with the *Third Year* and continues three terms. The First Term is devoted to Fruit Culture and Forestry. The origin, history, botanical position, methods of propagation, cultivation, pruning and training, harvesting and marketing, varieties, etc., of both the small and large fruits are studied. In Forestry special attention is given to the influence of forests upon climate, the value of timber, and the best methods of culture.

In the Second Term a course of lectures is given on Vegetable Culture, including kitchen and market-gardening, and seed-growing. Among the subjects considered are: Location of the garden, laying out ground, grading, draining, special preparation of soil, irrigation, management of composts, commercial fertilizers, implements, selection of seed, construction and management of green-houses, hot-beds, cold-frames; special crops, history, cultivation and varieties of each; growing seeds for home use and for market; the family kitchen-garden, etc.

The Third Term is devoted to Floriculture, including landscape-gardening. The general subject is divided into the following topics: Window-gardening, general management of house plants, hanging-baskets, climbing vines, flowering bulbs, ferneries, Wardian cases, etc.; out-door flower-gardening, lawns, ornamental shrubs and trees, commercial flower-gardening.

V. VETERINARY SCIENCE.

The regular course for students in Agriculture, Natural History, etc., embraces:

1. Five lectures a week during an entire academic year.

2. Laboratory work on the bones, clastic models, pathological preparations, and parasites of the domestic animals.

3. Clinical instruction on cases occurring in practice.

The lectures of the First Term are devoted to the anatomy and physiology of the animals of the farm. Attention is given to the principles of hygiene as affected by genus, breed, climate, soil, exposure, buildings, ventilation, drainage, food and water; to the varying anatomical peculiarities which imply special aptitude for particular uses; to the data for determining age; to the principles of breeding, of shoeing, etc.

The Second Term is devoted to lectures on general comparative pathology, on specific fevers and other contagious diseases, on the parasites and parasitic diseases of the domestic animals, and on constitutional diseases. An important feature in this course is the subject of Veterinary Sanitary Science and Police, embracing as it does the prevention of animal plagues by legislative and individual action; the improvement of unhealthy localities; and the destruction of animal poisons and parasites which are intercommunicable between man and the domestic animals.

In the Third Term the lectures treat of the local diseases of the various systems of organs in the different animals, and of veterinary surgery.

Opportunities are afforded to students who desire it to pursue the study of Veterinary Medicine and Surgery farther than is provided for in the regular courses of study.

The Courses in Agriculture.

I. A FOUR YEARS COURSE.

Leading to the degree of Bachelor of Agriculture.

FIRST YEAR.

First Term.—Geometry and conic sections, 5; freehand drawing, 3; German *or* French, 5; rhetoric, 2; six lectures on hygiene.

Second Term.—Algebra, 5; freehand drawing, 3; German *or* French, 5; rhetoric, 2.

Third Term.—General chemistry, practice and lectures, 3; German *or* French, 5; rhetoric, 2; trigonometry, 3; theory of equations, 2.

SECOND YEAR.

First Term.—Agricultural chemistry, 5; zoology, lectures and laboratory work (vertebrates), 3; anatomical practice, 2; German *or* French, 3; experimental mechanics *or* heat, 3.

Second Term.—Agricultural chemistry, 4; chemical practice, qualitative analysis, 5; anatomical practice, 2; German *or* French, 3; electricity and magnetism, 3.

Third Term.—Botany, lectures, 3, field work, 2; entomology, lectures, 2, practice, 2; German *or* French, 3; land surveying, 4.

THIRD YEAR.

First Term.—Compositæ and gramineæ, 2; practical horticulture, 3; entomology, 3; heat *or* experimental mechanics, 3; veterinary anatomy and physiology, 5.

Second Term.—Vegetable physiology, 3; vegetable histology, 2; practical horticulture, 2; chemical practice, quantitative analysis, 4; veterinary pathology, sanitary science, and parasites, 5.

Third Term.—Chemical practice, quantitative analysis, 9; veterinary medicine and surgery, 5; practical floriculture, 2.

FOURTH YEAR.

First Term.—Agriculture, lectures, 5; practice, 3 (Tuesday and Thursday afternoons); botany (fungi), 3, principles of horticulture, 2; geology, 3.

SECOND TERM.—Agriculture, lectures, 5; practice, 2 (Tuesday and Thursday afternoons); systematic and applied botany, 3; horticulture, 2.

THIRD TERM.—Agriculture, lectures, 3; practice, 3 (Tuesday and Thursday afternoons); building materials and construction, 2; American law, 5.

II. A THREE YEARS COURSE.

Not leading to a degree.

FIRST YEAR.

FIRST TERM.—Geometry and conic sections, 5; agricultural chemistry, 5; chemical practice, 3; freehand drawing, 3.

SECOND TERM.—Agricultural chemistry, 4; chemical practice, 6; algebra, 5.

THIRD TERM.—Botany, lectures, 3, field work, 2; entomology, lectures, 2, practice, 2; trigonometry, 3; theory of equations, 2.

SECOND YEAR.

FIRST TERM.—Compositæ and gramineæ, 2; practical horticulture, 3; geology, 3; experimental mechanics, 3; veterinary anatomy and physiology, 5.

SECOND TERM.—Vegetable physiology, 3; vegetable histology, 2; practical horticulture, 2; chemical practice, 4; veterinary pathology, sanitary science, and parasites, 5.

THIRD TERM.—Practical floriculture, 2; chemical practice, 4; land surveying, 4; veterinary medicine and surgery, 5.

The third year is the same as the fourth year of the four years course.

For the requirements for admission to the Courses in Agriculture see page 31.

MECHANIC ARTS.

In 1870, the Honorable Hiram Sibley provided for the erection of a suitable building for the Department of Mechanic Arts. He also gave ten thousand dollars for increasing its furniture, and has since made a further gift of thirty thousand dollars for the endowment of the Professorship of Mechanical Engineering.

Closely connected with the lecture-rooms are the rooms for designing machinery, pattern-making, and the workshop—devoted solely to instruction in practical work. The shop-practice embraces work requiring the use of all hand-tools, and the machines employed in the ordinary machine-shops. The shop is provided with a number of superior tools capable of performing all varieties of work, with surface plates, standard gauges, and a standard measuring machine, to accustom the students to accurate workmanship.

Each student in the department is required to devote two hours a day to work in the shop, though such students as have, before entering, acquired sufficient practical knowledge are admitted to advanced standing. Attendance upon ten lectures or recitations a week, or their equivalent, in addition to two hours daily drawing, two hours daily shop-practice, and the passing of the examinations at the close of each term, are necessary to remaining in the department.

The Course in Mechanic Arts.

Leading to the degree of Bachelor of Mechanical Engineering.

FIRST YEAR.

FIRST TERM.—Geometry and conic sections, 5; French *or* German, 5; freehand drawing, 3; shop-practice, 3.

SECOND TERM.—Algebra, 5; French *or* German, 5; freehand drawing, 3; shop-practice, 3.

THIRD TERM.—Trigonometry, 3; theory of equations, 2; French *or* German, 5; descriptive geometry, 3, drawing, 1; shop-practice, 3.

SECOND YEAR.

FIRST TERM.—Analytical geometry, 5; German *or* French, 3; experimental mechanics *or* heat, 3; descriptive geometry, 4, drawing, 2; shop-practice, 3.

SECOND TERM.—Calculus, 5; German *or* French, 3; chemical lectures, 3; electricity and magnetism, *or* metallurgy, 3; shop-practice. 3.

THIRD TERM.—Calculus, 5; German *or* French, 3; electricity and magnetism, *or* machine construction, 3; chemical lectures, 3; shop-practice, 3.

THIRD YEAR.

FIRST TERM.—Calculus, and analytical geometry, 5; shades, shadows, and perspective, 3; heat *or* experimental mechanics, 3; rhetoric 2; shop-practice, 3.

SECOND TERM.—Metallurgy *or* electricity and magnetism, 3; mechanics, 5; machine construction, 4; rhetoric, 2; shop-practice, 3.

THIRD TERM.—Machine construction *or* electricity and magnetism, 3; mechanics, 5; mill work, 4; drawing, 2; shop-practice, 3.

FOURTH YEAR.

FIRST TERM.—Mechanism, 5; machine drawing, and lectures, 4; mechanics, 5; shop-practice, 3.

SECOND TERM.—Designing machinery, and lectures, 4; steam-engine, 5; physical laboratory practice, 4; shop-practice, 3.

THIRD TERM.—Building materials and construction, 3; field practice and the use of instruments, 3; special study, and lectures, 4; working drawings, 4; shop-practice, 3.

For the requirements for admission to the Course in Mechanic Arts see page 31.

MILITARY SCIENCE.

Pursuant to the Act of Congress creating the land-grant on which the Cornell University is founded, and the Act of the Legislature of the State of New York assigning that land grant, instruction is provided in Tactics and Military Science. Drill and Military Science are "a part of the studies and exercises in all courses of study and in the requirements of all students in the University" during the First and Third Terms of the *First* and *Second Years* and the Second Term of the *Fourth Year.* Foreigners and laboring students and those physically unfitted therefor are excused from drill. Students are required to provide themselves with the University uniform, except such as may be excused on account of their inability to procure it, and they are held accountable for loss or injury to the arms and other public property issued to them.

The course extends through the First and Third Terms of the first two years, and the Second Term of the *Fourth Year.* During the first two years there are three exercises a week, of an hour each; those of the *Fourth Year* consist of a regular course of lectures on the general operations and science of war, twice a week.

Any student who has satisfactorily performed all the duties required for the first two years, and who is qualified therefor, may be selected for the place of a commissioned officer if needed. For the performance of his duties as a commissioned officer in the *Third* or *Fourth Year* he is entitled to a credit of three recitations a week for each term; and, at graduation, he may receive a certificate of military proficiency with his diploma.

The practical Military Exercises include: (1) *Infantry Tactics.*—To comprise the schools of the soldier, company, and battalion; with skirmishing, the forms of parade, and the duties of guards. (2) *Artillery Tactics.*—To comprise at least the school of the piece

and section for the field guns, with such further artillery instruction as may be found practicable. (3) *Special Exercises.*—To comprise recitations at such times as may be prescribed.

The advanced course of instruction in Military Science is optional, and is open to all undergraduates and to such special students as have sufficient scientific and practical preparation.

The course of instruction requires an attendance upon a class exercise or lecture of one hour on three days of the week during one year. The subjects are: (1) *Military Engineering.*—To comprise the principles of military topography; the effect of projectiles; the principles of fortification with their application to field works; military mining; the attack and defense of works, and military roads and bridges. (2) *The Art of War.*—To comprise the history and principles of special tactics; the organization of armies, with some account of the administrative arrangements of our own army; strategy; grand tactics; and accessory operations of war. (3) *Military Law.*—To comprise the origin, principles, and limitations of military law; the nature and force of the articles of war and the general regulations for the army; a summary of the rules of evidence; the constitution, jurisdiction, and procedure of courts-martial, courts of inquiry, military commissions, and military boards.

ARCHITECTURE.

The Course in Architecture is so arranged as to give the student instruction in all subjects which he must understand in order to enter upon the practice of the art. The lectures cover the whole ground, practical, scientific, historical, and æsthetic. The aim of the department is not chiefly to develop the artistic powers of the student, but rather to lay that foundation of knowledge without which there can be no true art.

Besides the White Architectural Library, means of illustration are provided for this department in valuable collections of photographs, drawings, models, casts, and samples of building materials.

The Course in Architecture.

Leading to the degree of Bachelor of Architecture.

FIRST YEAR.

First Term.—Geometry and conic sections, 5; French *or* German, 5; rhetoric, 2; free-hand drawing, 3; linear drawing, 1; six lectures on hygiene.

Second Term.—Algebra, 5; French *or* German, 5; rhetoric, 2; free-hand drawing, 3; projection and tinting, 1.

Third Term.—Trigonometry, 3; theory of equations, 2; descriptive geometry, 3, drawing, 1; French *or* German, 5; botany, 3.

SECOND YEAR.

First Term.—Analytical geometry, 5; descriptive geometry, 4, drawing, 2; French *or* German, 3; experimental mechanics *or* heat, 3; composition and elocution, 1.

Second Term.—Calculus, 5; French *or* German, 3; electricity and magnetism, *or* acoustics and optics, 3; chemical lectures, 3; drawing, 3; composition and elocution, 1.

Third Term.—Building materials and construction, 3; French *or* German, 3; chemical lectures, 3; electricity and magnetism, *or* acoustics and optics, 3; drawing, 5; composition and elocution, 1.

THIRD YEAR.

First Term.—Shades, shadows and perspective, 3; mechanics (strength of materials), 3; heat *or* experimental mechanics, 3; lectures on Egyptian, Greek, and Roman architecture, 3; designing, and lectures, 4.

Second Term.—Lithology and determinative mineralogy, 2; lectures on Byzantine and Romanesque architecture, 5; mechan-

ics (trusses), 3; designing, 3; acoustics and optics, *or* electricity and magnetism, 3.

THIRD TERM.—Mechanics (arches), 2; lectures on Gothic architecture, 5; free-hand drawing, 3; designing, 3; acoustics and optics *or* electricity and magnetism, 3.,

FOURTH YEAR.

FIRST TERM.—Lectures on Renaissance architecture, 3; geology, 3; designing, 6; stereotomy, 3.

SECOND TERM.—Stereotomy, applied to stone-cutting, 5; lectures on modern architecture, 3; economic geology, 3; designing, 4.

THIRD TERM.—Lectures on decoration, acoustics, ventilation, warming, professional practice, measuring, contracts, specifications, etc., 3; designing, 9.

For the requirements for admission to the Course in Architecture see page 31.

CIVIL ENGINEERING.

The instruction is given by means of lectures and recitations, with drafting, and field and laboratory practice. Chemistry, Physics, Resistance of Materials, and Stone-cutting are taught practically. The field work embraces the usual operations and more recent methods of Land and Railroad Surveying, together with Hydrography and Geodetic practice. The latter embraces all the topographical, astronomical, and geodetic operations required in triangulating and making the chart projections of the coasts and interior of large territories.

Besides the application of mechanics and of the higher analysis to engineering investigations, the pro-

fessional preparation of the students comprises the following subjects: The location and construction of railroads, canals and water-works; the surveys and improvements of coasts, harbors, rivers, and lakes; the determination of geographical and astronomical co-ordinates; the application of mechanics, graphical statics, and descriptive geometry to the construction of the various kinds of arch bridges and the design and construction of roofs, trusses, girders, and suspension bridges; the design, construction, and application of wind and hydraulic motors, air and steam-engines; the construction and management of iron, steel, chemical and pneumatic works; the preparation of the various kinds of drawings and projections used by the engineer, and the application, selection, and tests of the materials used in constructions, and the frequent preparation of papers and essays on subjects of professional importance, designed both as a literary exercise and to increase the student's knowledge of some particular subject, which he is thus required to investigate.

The principal subdivisions of the work of this department are bridge architecture and construction, railroad engineering, hydraulic, topographical, sanitary, industrial, and mining engineering.

To meet the growing demand for special engineering studies, some option and diversity of study is allowed from the beginning of the third year of the courses to those students who evince special fitness for any particular branch of the subject. The Four Years course is mainly technical, and is designed for those who cannot afford the time to take the Five Years course. The latter contains the same technical studies as the former; but in addition students have in it one year of optional work alternating with prescribed studies, which they can devote to further scientific research, or to historical or literary subjects.

The Courses in Civil Engineering.

I. A FOUR YEARS COURSE.

Leading to the degree of Bachelor of Civil Engineering.

FIRST YEAR.

FIRST TERM.—Geometry and conic sections, 5; French *or* German, 5; rhetoric, 2; freehand drawing, 3; six lectures on hygiene.

SECOND TERM.—Algebra, 5; French *or* German, 5; rhetoric, 2; right line drawing, 2; freehand drawing, 3.

THIRD TERM.—Trigonometry, 3; theory of equations, 2; descriptive geometry, 3; drawing, 1; French *or* German, 5; botany, 3.

SECOND YEAR.

FIRST TERM.—Analytical geometry, 5; descriptive geometry, 4, drawing, 2; French *or* German, 3; experimental mechanics *or* heat, 3.

SECOND TERM.—Calculus, 5; French *or* German, 3; electricity and magnetism, *or* acoustics and optics, 3; chemical lectures, 3; pen topography, 2; tinting and shading, 2.

THIRD TERM.—Calculus, 5; land surveying, 4; electricity and magnetism, *or* acoustics and optics, 3; chemical lectures, 3; composition and elocution, 1; lettering, 2.

THIRD YEAR.

FIRST TERM.—Calculus and analytical geometry, 5; geology, 3; shades, shadows, and perspective, 3; heat *or* experimental mechanics, 3; topographical mapping and sketching, 2; essays, 1.

SECOND TERM.—Economic geology, 3; analytical mechanics, 5; mineralogy *or* metallurgy, 2; acoustics and optics, *or* electricity and magnetism, 3; structural details and graining, 2.

THIRD TERM.—Analytical mechanics, 5; railroad surveying, 5; acoustics and optics, *or* electricity and magnetism, 3; colored topography, 3.

FOURTH YEAR.

FIRST TERM.—Spherical and practical astronomy, 5, night observations, 2; analytical mechanics, 5; civil engineering, 2;

Egyptian, Greek, and Roman architecture, 3; stereotomy, 3; drafting of original problems, and technical essay.

SECOND TERM.—Analytical mechanics, 5; higher geodesy, 5; metallurgy *or* mineralogy, 2; stone-cutting, original problems, drawing and practice, 5.

THIRD TERM.—Civil engineering, 3; engineering economy, 2; bridge construction, 5; hydraulic motors, 2; hydrographic survey, chart making and geodetic practice, 3.

Students in these courses are required to write memoirs upon professional subjects of their own selection, before the close of the Third Term; and these memoirs are presented during the first week of the First Term. The memoirs of the last two years must contain original investigations.

II. A FIVE YEARS COURSE.

Leading to the degree of Civil Engineer.

With optional studies in history, literature, architecture, languages, and general or technical sciences. The first and second years of this course are the same as in the preceding course.

THIRD YEAR.

FIRST TERM.—Calculus and analytical geometry, 5; heat *or* experimental mechanics, 3; topographical mapping and sketching, 2; Roman history, 5, *or* physiology *or* zoology (vertebrates), 3, and modern languages, 2; essays, 1; English literature, 2.

SECOND TERM.—Analytical mechanics, 5; acoustics and optics, *or* electricity and magnetism, 3; structural details and graining, 2; philosophy of history, 3; history of the Roman empire, 5, *or* zoology (invertebrates), 3, and modern languages, 2, *or*, instead of languages, essays and orations, 1, and English literature, 2.

THIRD TERM.—Analytical mechanics, 5; railroad surveying, 5; acoustics and optics, *or* electricity and magnetism, 3; mediæval history, 5, *or* laboratory work, 3, and modern languages, 2, *or*, instead of languages, essays and orations, 1, and English literature, 2.

FOURTH YEAR.

FIRST TERM.—Geology, 3; analytical mechanics, 5; Egyptian, Greek, and Roman architecture, 3; shades, shadows, and perspective, 3; civil engineering, 2; American history, 2, *or* literature and oratory, 3.

SECOND TERM.—Economic geology, 3; analytical mechanics, 5; American history, 2, *or* Romanesque architecture, 3, *or* modern languages, 2; political economy, 2; literature and oratory, 3.

THIRD TERM.—Civil engineering, 3; engineering economy, 2; bridge construction, 5; colored topography, 3; two weeks of hydrographic field work, 3; logic, 3, *or* modern languages, 3, *or* extempore speaking, lectures on orators and oratory, 3, *or* Gothic architecture, 3.

FIFTH YEAR.

FIRST TERM.—Spherical and practical astronomy, 5, night observations, 2; stereotomy and drawing of original problems, 3; special work in projects, designs, and estimates, 3; Renaissance architecture, 3; modern history, 3, *or* riparian rights and law of contracts, 3.

SECOND TERM.—Higher geodesy, 5; stone-cutting, original problems, drawing, and practice, 5; metallurgy, 2; technical reading in foreign languages, 2; special work in astronomy and geodesy, 3.

THIRD TERM.—American law *or* quaternions and philosophy of mathematics, 5; hydraulic motors, 3; historical reading, 2; hydrographic survey, chart making, and geodetic practice, 3; the steam-engine, 2; original thesis.

On the satisfactory completion of the first four years of this course, students may take the degree of B. S., and become entitled to all the privileges of resident graduates.

For the requirements for admission to the Courses in Civil Engineering see page 31.

MATHEMATICS AND ASTRONOMY.

The instruction offered by this Department is designed to meet the wants of all classes of students. Undergraduates in all the regular courses except Natural History have the Mathematics of the *First Year*, namely, geometry, algebra, and trigonometry; those in Mechanic Arts, Architecture, and Civil Engineering have two or four terms of the analytical geometry and calculus; those in most of the general scientific courses have analytical geometry and astronomy; and all students have the privilege of electing these and the higher branches. The full course given below is designed for those intending to teach Mathematics in academies and colleges, or to use it as an instrument of investigation.

According to the subject taught, there are five, three, two, or one exercise a week, consisting of lectures and recitations, with the solution of problems or with other written exercises; and, to an extent equivalent to at least five recitations a week for three terms, the later work is from French or German text-books.

In all the classes frequent reviews and examinations are held during the term, besides the regular examination at the close. These preliminary examinations cover previous as well as current work, and test the student's command of general principles and methods as well as of details. They are often given without notice.

The Course in Mathematics.

Leading to the degree of Bachelor of Science.

FIRST YEAR.

First Term.—Solid geometry and conic sections, 5; French, 5, and German, 3, *or* German, 5, and French, 3; rhetoric, 2; hygiene, six lectures.

SECOND TERM.—Algebra, 5; linear drawing, 2; French, 5, and German, 3, *or* German, 5, and French, 3; rhetoric, 2.

THIRD TERM.—Trigonometry, 3; theory of equations, 2; French, 5, and German, 3, *or* German, 5, and French, 3; rhetoric, 2.

SECOND YEAR.

FIRST TERM.—Analytical geometry, 5; mathematical essays, 1; experimental mechanics, *or* heat, 3; physiology, 3; free-hand drawing, 3; composition and elocution, 1.

SECOND TERM.—Calculus, 5; mathematical essays, 1; free-hand drawing, 3; electricity and magnetism, *or* acoustics and optics, 3; chemical lectures, 3; composition and elocution, 1.

THIRD TERM.—Calculus, 5; mathematical essays, 1; descriptive geometry, 3; drawing, 1; electricity and magnetism, *or* acoustics and optics, 3; chemical lectures, 3; composition and elocution, 1.

THIRD YEAR.

FIRST TERM.—Calculus and analytical geometry, 5; determinants, 2; descriptive geometry, 4, drawing, 2; heat *or* experimental mechanics, 3; essays, 1.

SECOND TERM.—Differential equations, 5; harmonoid geometry, 3; descriptive astronomy, 3; mathematical essays, 1; acoustics and optics, *or* electricity and magnetism, 3; essays and orations, 1.

THIRD TERM.—Theory of functions, 5; physical astronomy, 3; mathematical essays, 1; acoustics and optics, *or* electricity and magnetism, 3; botany, 3; essays and orations, 1.

FOURTH YEAR.

FIRST TERM.—Quaternions, 5; mathematical essays, 1; shades, shadows, and perspective, 3; geology, 3; modern history, 3; English literature, 2.

SECOND TERM.—Mécanique analytique, 5; quaternions, *or* modern methods in analytical geometry, *or* applied mathematics, 5; mathematical essays, 1; philosophy of history, 3; English literature, 2.

THIRD TERM.—Mécanique analytique, 5; quaternions, *or* modern methods in analytical geometry, *or* applied mathematics, 3; mathematical essays, 1; logic, 3; English literature, 2; Constitution of the United States, twelve lectures.

For most of the studies which are not closely connected with Mathematics substitutes are allowed.

For the requirements for admission to the Course in Mathematics see page 31.

PHYSICS.

The instruction comprises a General Course of rather elementary character, and a Laboratory Course of advanced work for graduates and such undergraduates as are qualified to pursue it.

The exercises of the General Course consist of lectures illustrated by experiment, and recitations. It begins with the First Term of the Second Year, and continues two years. There are four subjects, distributed as follows: Experimental Mechanics one term; Electricity and Magnetism two terms; Heat one term; Acoustics and Optics two terms. The lectures on any one subject occur once in two years. A knowledge of Mathematics through Plane Trigonometry is required for registration in any one of these subjects, and for registration in Electricity and Magnetism a knowledge of Experimental Mechanics also. With the exception mentioned the several subjects are treated so far independently that they may be pursued in any order.

Each student must have the following text-books: Deschanel's *Natural Philosophy*, Cumming's *Electricity and Magnetism* (used in connection with the lectures on Mechanics), Fleming Jenkin's *Electricity and Magnetism*, Balfour Stewart's *Heat*, and the *Notes* on the Lectures. The *Notes* contain references by page and paragraph to works which may be consulted in the University Library.

The Laboratory Course affords opportunity for mak-

ing a more advanced study of the science than the General Course provides. Experiments are performed and the work is recorded and discussed. The experiments are chiefly of a quantitative nature, as better adapted to develop a thorough knowledge of the subject; but the special wants and aims of each student are consulted, and those who intend to teach the subject may spend a part of the time on experiments that are merely illustrative. For admission to the Laboratory some general knowledge of Physics is required; and some acquaintance also with Analytical Geometry and the Calculus will be found of great advantage.

CHEMISTRY AND MINERALOGY.

I. *DESCRIPTIVE AND THEORETICAL CHEMISTRY.*

The instruction begins with the lectures on Inorganic Chemistry in the First Term of the *Second Year.* During the whole of that year two lectures a week are given on the theoretical principles and the general study of the chemistry of inorganic bodies. During the First Term of the *Third Year*, a course of lectures is given on the Chemistry of Organic Bodies. In addition to the final examination at the end of the term occasional examinations are held during the term, of which no previous notice is given, the students being expected to hold themselves in readiness for such an examination at all times.

For laboratory instruction in this branch of the subject a course of introductory practice is given, which is required of all students in the Course in Science in the Third Term of the *Sec-*

ond Year, and of students in the courses in Chemistry and Physics, and in Agriculture; it is required, further, of all students in other courses who take chemical practice as an optional study, in the beginning of their practice, except those who can give only the minimum amount of time (seven and a half hours a week) for two or three terms, and who for good and sufficient reasons desire to devote all that time to chemical analysis. This introductory practice consists in the performance by the student of a series of experiments illustrating the more important general principles of the science; the details of the manipulation of each experiment are carefully described, but the results to be obtained are not given; for the better cultivation of the student's powers of observation he is required to observe and describe these results for himself, and trace their connection with the principles which they are intended to illustrate.

The instruction in theoretical chemistry is continued in the Course in Chemistry and Physics, by recitations in Chemical Philosophy and lectures on organic chemistry.

Metallurgy and Mineralogy.—During the Second Term two lectures a week are devoted to each of these subjects in alternate years. The Course in Metallurgy is intended to give the students in the technical courses a general idea of fuels, ores, and the most important methods of extracting the various metals which are especially used in construction, the metallurgy of iron claiming naturally the most attention. A certain amount of laboratory work in blowpipe analysis, with practice in the identification of crystalline forms, is required in connection with the lectures on Mineralogy.

II. *AGRICULTURAL AND ANALYTICAL CHEMISTRY.*

The general subject of Agricultural Chemistry is treated in a series of about one hundred lectures, for an account of which see page 38.

The Course in Analytical Chemistry, beginning in the *Second Year*, comprises Qualitative and Quantitative

Analysis in the wet way, and in the dry way (Blowpipe Analysis and Assaying), and is adapted in respect to length and completeness to the special course of study the student is pursuing.

In the Course in Chemistry and Physics, leading to the degree of B. S., the qualitative analysis in the wet way and the blowpipe analysis are taken in the first two terms, beginning with the Second Term of the *Second Year;* this work may or may not, according to the proficiency attained in these two terms, extend into the following term. In connection with the quantitative work, which occupies at least a large part of the time devoted to chemical practice in the *Third* and *Fourth Years* of this course, some practice in qualitative analysis is continued.

The quantitative work begins with general practice in the determination of bases and acids by gravimetric and volumetric methods, after which follow the analysis of minerals, ores and technical products in the wet way, and dry assaying, organic ultimate and proximate analysis, the analysis of gaseous mixtures, the chemical examination of waters and articles of food, spectroscopic analysis, the preparation of substances, and, finally, the thesis for graduation, to which most of the time of the last two terms of the course should be devoted.

Lectures are given on methods and processes of analysis during the entire course, and examinations are required at the close of every term.

In the Course in Agriculture, the analytical practice of the agricultural chemistry begins in the First Term of the *Second Year*, and comprises analysis in the wet way only; it is confined to those substances that may occur in agricultural materials and products. The qualitative analysis should be completed in the two terms of this year, so that all the time given to the subject in the *Third Year* may be devoted to quantitative analysis. This quantitative work begins, as in the Course in Chemistry and Physics, with general practice in the determination of bases and acids by gravimetric and volumetric methods; the chemical examination of fertilizers, soils, and agricultural products occupies the remainder of the course. Lectures and examinations accompany the practice, as in the Course in Chemistry and Physics.

In the Course in Engineering a course of practice in Blowpipe Analysis is provided, which is intended to give to engineers such facility in the use of the blowpipe in determinative mineralogy as will enable them to avail themselves of this useful instrument in their field work, for the determination of the character of rocks and minerals.

In the Medical Preparatory Course, a short course of qualitative and quantitative analysis in the wet way is given, which may carry the student far enough to qualify him to examine animal liquids by chemical methods for assistance in the diagnosis of disease. The practice that is necessary for acquiring merely the rudiments of chemical analysis, renders it impracticable to accomplish more than this in the allotted time in this course. Students intending to study medicine who have more time for chemical practice, can take a longer and more thorough course which includes a better foundation in quantitative work, and a wider application of the proficiency thus gained to the chemical examination of animal substances, and articles of food and drink, and to medical jurisprudence. A small number of lectures is given in connection with this practice, on the subject of medical analytical chemistry.

III. *INDUSTRIAL CHEMISTRY.*

A course of lectures is given in the Third Term of each year, and the subject is begun anew every second year.

The lectures relate to the applications of chemistry in the manufacturing industries and in daily life, and include among others the following subjects: acids and heavy chemicals, soaps, oils, coal gas, coal tar and its derivatives, glass, pottery, mortar and cement, leather, paper, paints, dyes and dying, alcoholic liquors, food, water, and air.

The treatment of these subjects embraces the consideration of the chemical nature of raw materials and the changes which they undergo in the course of manufacturing processes, the apparatus used and its resistance to chemical agents, the utilization or eco-

nomical disposition of waste, and the perfection and purity of finished products. The subjects of food, water, and air are also considered from a chemical standpoint with reference to their sanitary and industrial relations.

In connection with these lectures a course of laboratory work is provided, which bears upon the industrial applications of chemistry, and special courses are laid out for students with reference to the needs of any branch of industry they may select. This work consists of analyses of raw materials and commercial products, determinations necessary to the chemical control of a technical process in its different stages, and, when the student is sufficiently prepared, of original investigation with a view to the improvement of some industrial method.

Practical illustration of the different subjects treated is furnished not only in the collections belonging to the department but also by means of excursions to mills and manufactories.

Besides the private chemical laboratories, for the professors and for special work, there are others with accommodations for two hundred students. They are provided with gas, water from the University mains, Bunsen filtration pumps, and a full supply of apparatus necessary for the prosecution of the study of chemistry in its various branches. The reading room of the laboratory contains the best works of reference in English, French, and German, and the current numbers of the more important chemical journals.

The Course in Chemistry and Physics.

Leading to the degree of Bachelor of Science.

FIRST YEAR.

First Term.—Geometry and conic sections, 5; French, 5, and German, 3, *or* German, 5, and French, 3; rhetoric, 2; six lectures on hygiene.

Second Term.—Algebra, 5; French, 5, and German, 3, *or* German, 5, and French, 3; rhetoric, 2.

Third Term.—Trigonometry, 3; theory of equations, 2; French, 5, and German, 3, *or* German, 5, and French, 3; rhetoric, 2.

SECOND YEAR.

First Term.—Analytical geometry, 5; French *or* German, 3; experimental mechanics *or* heat, 3; zoology, lectures and laboratory work, 3; composition and elocution, 1.

Second Term.—Chemical lectures, 3; electricity and magnetism, *or* acoustics and optics, 3; French *or* German, 3; zoology, lectures and laboratory work (invertebrates), 3; chemical practice, 5.

Third Term.—Chemical lectures, 3; electricity and magnetism, *or* acoustics and optics, 3; French *or* German, 3; botany, 3; chemical practice, 5.

THIRD YEAR.

First Term.—Chemical philosophy, 3; heat *or* experimental mechanics, 3; geology, 3; chemical practice, 7.

Second Term.—Chemical philosophy, 3; mineralogy *or* metallurgy, 2; organic chemistry, 1; acoustics and optics, *or* electricity and magnetism, 3; economic geology, 3; chemical practice, 5.

Third Term.—Chemical philosophy, 3; chemical technology, 2; acoustics and optics, *or* electricity and magnetism, 3; chemical practice, 7.

FOURTH YEAR.

First Term.—History of philosophy, 3; physical practice, 4; chemical practice, 10; organic chemistry, 1.

Second Term.—Metallurgy *or* mineralogy, 2; organic chemistry, 2; chemical practice, 8; physical practice, 4.

Third Term.—Chemical technology, 2; chemical processes, 2; chemical practice, 8; organic chemistry, 1.

For the requirements for admission to the Course in Chemistry and Physics see page 32.

NATURAL HISTORY.

I. *BOTANY.*

A course of lectures is given upon each of the following subjects: Physiological Botany, Gramineæ and Compositæ, Vegetable Physiology, Vegetable Histology, Systematic and Applied Botany, Plant Culture, Higher Cryptogamia, Fungi, and Algæ. Most of these courses of lectures are given in connection with laboratory work, which is further supplemented, whenever desirable, by field-work or class excursions.

The foregoing courses of instruction occupy five hours a week for six terms, or two years. Their arrangement as regards the collegiate terms and years is seen in the tabulated statement of the Course in Natural History.

The instruction in the various branches of Botany does not lose sight of the practical bearings of the science. Thus in Fungi a careful study is made of those forms which are destructive to cultivated plants; and in Systematic Botany, besides a study of the principles of classification and the special characteristics of the more prominent natural orders, notices are given of the history, uses, and importance of the chief economic species included in those orders.

The full Course in Botany as laid down is not intended to be absolutely rigid, but students whose standing will warrant it may shape their studies by their taste, or by the ultimate object they have in view. Those who have completed a large share of the regular course are afforded opportunities for advanced work, consisting mainly of original investigations in some special branch of botanical science.

Besides the special facilities for instruction provided in the various collections, models, and apparatus belonging to the department, the local flora of more than a thousand species of phænogamia, and a proportionate number of cryptogamia, together with a considerable collection of exotic plants grown in the laboratories and in the borders and grounds, affords valuable means of illustration and material for work.

II. *GEOLOGY AND LITHOLOGY.*

Instruction is given in General and Economic Geology and Lithology by means of lectures, laboratory practice, and excursions. The lectures consist of (1) a course in General Geology in the First Term, and (2) a course in Economic Geology in the Second Term.

Facilities for laboratory practice in Geology and Lithology are offered throughout the year, with excursions during the First and Third Terms.

Collections are provided in the Museum of Geology and Palæontology, and the Devonian rocks of Ithaca and neighborhood offer unlimited material for study and original research.

III. *PALÆONTOLOGY.*

Instruction is given each term in the laboratory, and during the First and Third Terms by excursions to the rich fossiliferous localities in and about Ithaca. Special lectures accompany the work of the First and Second Terms, and a regular course on Systematic Palæontology is given in the Third Term.

IV. *ZOOLOGY.*

The instruction comprises lectures, laboratory practice, and field work as follows:

A. LECTURES.—*First Term.*—1. Hygiene, with especial reference to the needs of students, 6 lectures. 2. Human physiology, with painless experiments upon the frog and cat, 36 lectures. 3. Zoology of vertebrates, 36 lectures and practical exercises. 4. The anatomy and physiology of domesticated animals, 60 lectures. 5. Psychology and æsthetics, 24 lectures. 6. Anatomical technology, 12 lectures.

Second Term.—1. Zoology, 30 lectures. 2. Veterinary pathology, sanitary science, and parasites, 50 lectures. 3. Microscopical technology, 10 lectures, with practical demonstrations.

Third Term.—1. Comparative anatomy, either of the brain, or of some special group of vertebrates, 20 lectures. 2. Veterinary medicine and surgery, 50 lectures. 3. Economic entomology, 20 lectures. 4. Museum methods, and experimental technology, 10 lectures.

B. Laboratory Practice.—This varies with the needs of the student and the extent of his preparation. Usually, as a basis for any other work, the skeletons of man and the domestic cat are studied, and some of the bones described and drawn by the student. He then dissects some of the muscles, vessels, and nerves. In the Second Term, the methods of microscopic manipulation are learned, and the tissues of the cat, frog, and menobranchus are examined. In the Third Term the student examines the brain, heart, and other viscera of the cat, and performs for himself the simpler physiological experiments. Ordinarily this work can be commenced only at the beginning of the year.

After the First Year the student, according to his purposes, dissects other vertebrate animals or human subjects; or insects and other invertebrates. The advanced work in entomology may be either economic, or systematic, anatomical, histological, or embryological. There are special facilities for the study of the vertebrate brain.

C.—Field Work.—During the Fall and Spring students are occasionally accompanied by their instructors to the field or lake in order to observe living animals and learn the methods of their capture. The outdoor study of insects injurious to vegetation is an important element of the instruction in economic entomology.

The Anatomical Laboratory has accommodations for the practical instruction of twenty special students, and is provided with microscopes, and other apparatus for anatomical and physiological work. In a large aquarium are living fishes and other fresh-water animals. Among these is the Menobranchus, which abounds in Cayuga Lake, and which supplies the best material for some experiments and histological demonstrations.

The Entomological Laboratory is provided with microscopes and other instruments and materials for research and instruction

concerning insects, especially those which are injurious to vegetation.

There are extensive zoological, economic, and biological collections, with histological preparations, Auzoux models, diagrams, and other materials for instruction.

The Course in Natural History.

Leading to the degree of Bachelor of Science.

FIRST YEAR.

FIRST TERM.—French, 5, and German, 3, *or* German, 5, and French, 3; rhetoric, 2; free-hand drawing, 3; six lectures on hygiene.

SECOND TERM.—French, 5, and German, 3, *or* German, 5, and French, 3; rhetoric, 2; chemical lectures, 3; chemical laboratory work, 3.

THIRD TERM.—French, 5, and German, 3, *or* German, 5, and French, 3; rhetoric, 2; chemical lectures, 3; chemical laboratory work, 3.

SECOND YEAR.

FIRST TERM.—French *or* German, 3; composition and elocution, 1; human physiology, 3; zoology, lectures and laboratory work (vertebrates), 3; laboratory work in anatomy, 2; anatomical technology, 1; experimental mechanics *or* heat, 3; lectures on organic chemistry, 2.

SECOND TERM.—French *or* German, 3; composition and elocution, 1; zoology, lectures and laboratory work (invertebrates), 3; laboratory work in physiological anatomy and histology, 5; microscopical technology, 1; blow-pipe determination of minerals, 3.

THIRD TERM.—French *or* German, 3; composition and elocution, 1; botany, 3, field work in botany, 2; lectures on comparative anatomy of the brain, 2; laboratory work in comparative anatomy, 3; museum methods and experimental technology, 1.

THIRD YEAR.

FIRST TERM.—Lectures and laboratory work on higher cryptogamia, 3; compositæ and gramineæ, 2; geology, 3; psychology, 2; heat or experimental mechanics, 3; essays, 1; English literature, 2.

SECOND TERM.—Vegetable physiology, 3; vegetable histology, 2; economic geology, 3; laboratory work in geognosy, 3; electricity and magnetism, *or* acoustics and optics, 3; essays and orations, 1; English literature, 2.

THIRD TERM.—Lectures and laboratory work on algæ, 2; lectures on palæontology, 3; laboratory work in palæontology, 3; lectures on entomology, 2; laboratory and field work in entomology, 3; electricity and magnetism, *or* acoustics and optics, 3.

FOURTH YEAR.

FIRST TERM.—Fungi, 3; lectures on plant culture, 2; lectures on the anatomy, physiology, and hygiene of domestic animals, 5; laboratory and field work in palæontology or geology, 5; history of philosophy, 3.

SECOND TERM.—Lectures on systematic and applied botany, 3; descriptive astronomy, 3; laboratory work in geology or palæontology, 3; advanced work in natural history, *or* veterinary science, 5; acoustics and optics, *or* electricity and magnetism, 3.

THIRD TERM.—Advanced work in natural history, *or* veterinary science, 8; physical astronomy, 3; acoustics and optics, *or* electricity and magnetism, 3.

V. *PRELIMINARY MEDICAL EDUCATION.*

Not leading to a degree.

There is no Medical Department of the University, but special facilities are provided for those who wish their course to be of direct use in the study of medicine.

The Faculty believe that the crowded and difficult curriculum of the medical schools should be preceded,

when possible, both by a broad general education, and by a special and practical training in certain branches. Hence, they strongly advise those who intend to become physicians to pursue some one of the full courses, and then to become Resident Graduates, reviewing physiology and chemistry, attending the lectures in veterinary science, and taking laboratory work in chemistry and anatomy.

When only four years are available, the courses in Natural History, Science, and Science and Letters afford more or less time for laboratory work, especially in the fourth year.

In case the student can remain but two years, he is advised to take the Two Years Course Preparatory to the Study of Medicine, which embraces the branches best calculated to serve as the basis of a proper medical course.

Finally, special students are received for a shorter period than two years, provided they are fitted to undertake the lectures and laboratory work.

A Two Years Course Preparatory to the Study of Medicine.

Not leading to a degree.

FIRST YEAR.

First Term.—Chemical laboratory practice, 3; zoology, lectures and laboratory work (vertebrates), 3; human physiology, 3; freehand drawing, 3; rhetoric, 2; French *or* German, 3; six lectures on hygiene.

Second Term.—Chemical lectures, 3; chemical laboratory practice, 3; zoology, lectures and laboratory work (invertebrates), 3; freehand drawing, 3; rhetoric, 2; French *or* German, 3.

Third Term.—Chemical lectures, 3; medical chemistry, laboratory practice, 4; botany, 3; botanical laboratory practice, 2; rhetoric, 2; French *or* German, 3.

SECOND YEAR.

FIRST TERM.—Organic chemistry, 2; anatomy, physiology, and hygiene of domesticated animals, 5; psychology, 2; anatomical technology, 1; anatomical laboratory practice, 2; German *or* French, 5.

SECOND TERM.—Vegetable physiology, 3; veterinary pathology, parasites, and sanitary science, 5; microscopical technology, 1; histological laboratory practice, 2; laboratory practice in vegetable physiology, 2; German *or* French, 5.

THIRD TERM.—Comparative anatomy of the brain, 2; laboratory practice in anatomy, 5; veterinary medicine and surgery, 5; museum methods and experimental technology, 1; German *or* French, 5.

Upon the completion of this course the student is entitled to a certificate countersigned by the professor in physiology. This certificate, or one covering an equivalent amount of similar work performed in either of the full four years courses or in post-graduate courses, usually exempts the holder from one of the three years of study under the direction of a physician commonly required for graduation in medicine.

For the requirements for admission to the above courses see page 33.

LANGUAGES.

I. *THE ANCIENT CLASSICAL LANGUAGES.*

An outline of the course of reading in the Classics is given below. Greek belongs to the Course in Arts, Latin to the courses in Arts, Literature, and Philosophy, and the distribution as to required and elective study may be seen by consulting the tabulated statements of those courses. Exercises in Greek and Latin composition accompany the study of the authors; lectures

are occasionally substituted for recitations; and the examinations regularly comprise the translation of passages not previously seen by the student.

Greek.

FIRST YEAR.

FIRST TERM.—Plato's Apology of Socrates.
SECOND and THIRD TERMS.—Homer and Herodotus.

SECOND YEAR.

FIRST TERM.—Thucydides.
SECOND and THIRD TERMS.—Euripides, Æschylus, Aristophanes (one play of each).

THIRD YEAR.

FIRST TERM.—Plato, continued.
SECOND and THIRD TERMS.—Sophocles.

FOURTH YEAR.

FIRST TERM.—Selections from the Attic Orators.
SECOND and THIRD TERMS.—Dramatic Poets, continued; selections from the Lyric and Bucolic Poets.

Latin.

FIRST YEAR.

FIRST TERM.—Livy.
SECOND TERM.—Cicero (Essays and Letters).
THIRD TERM.—Horace (Odes and Epodes).

SECOND YEAR.

FIRST TERM.—Tacitus (Agricola and Germania).
SECOND TERM.—Quintilian (Book X); selections from Roman lyric, elegiac, and epigrammatic poetry.
THIRD TERM.—Horace (Satires and Epistles).

THIRD YEAR.

First Term.—Plautus and Terence.
Second Term.—Pliny the Younger.
Third Term.—Lucretius and Virgil.

FOURTH YEAR.

First Term.—Tacitus (Annals).
Second Term.—Catullus, Cicero (Orations and Dialogues).
Third Term.—Juvenal and Persius.

II. *ORIENTAL LANGUAGES.*

None of the languages here included are required for any Baccalaureate degree conferred by the University. The Professor of Sanscrit and Living Asiatic Languages gives, in addition to special instruction, lectures bearing upon ethnographical philology and general linguistic science.

Hebrew, Chaldee, and Ancient Syriac are taught by Professor Wilson.

III. *GERMANIC LANGUAGES.*

The first two years in German are specially intended, besides preparing the student for progressive and independent work in the language, to give those who have not a classical training, some grammatical discipline, and an insight into the growth and relations of Indo-Germanic speech. Instruction is also given to optional classes in the more advanced study of the Germanic languages.

German.

During the whole of the *First Year* Whitney's Grammar and Reader are used, accompanied by Ahn's (Fischer's) exercises in writing German. In the First Term a knowledge of the inflections is gained, and the strong verbs are begun, stories and ballads are translated, with daily exercises in writing. In the Second Term the strong verbs are completed, the syntax of nouns, uses of the moods, and the arrangement of sentences are studied, with advanced translation and writing German. In the Third Term, with advanced translation and writing, exercises in translation at sight are also given, and the relation of English to German is traced by the application of Grimm's Law, in connection with the special study of etymology.

In the First Term of the *Second Year* one of Schiller's or Goethe's dramas is studied, followed in the Second Term by extracts from Goethe's or Schiller's prose. In the Third Term Goethe's *Hermann und Dorothea*, Lessing's *Minna von Barnhelm*, or some similar work, is read.

During the *Third* and *Fourth Years* occur optional lectures and recitations on German history, literature, and mythology, and courses are given varying from year to year, embracing the works of the leading authors. Classes are also formed in composition and conversation, recent dramatic literature and the works of living novelists are read.

Other Germanic Languages.

Special instruction is given in Gothic. Old and Middle High German, and in the Scandinavian and Netherland languages.

In Gothic, Heyne's and Bernhardt's editions of *Ulfilas* are used. In Old German, Braune's *Althochdeutsches Lesebuch* is used, and lectures are given on the early German alliterative poetry and the later forms of German verse. In Middle High German the epic, lyric, and didactic poetry is studied, with the addition of prose selections. The Netherland languages are pursued with special reference to the explanation of English forms and idioms, and works in modern Dutch and Flemish are read.

The Scandinavian languages are taught chiefly by means of German text-books; Swedish, Danish, and Icelandic are studied, and lectures are given on Scandinavian history and literature.

IV. *ROMANCE LANGUAGES.*

French.

French Grammar is studied during the First and Second Terms, and translation is begun in the Third. In the *Second Year* classical French plays are read. After two years, French is optional, and those who elect it read the history of French literature.

Italian.

FIRST YEAR.

First Term.—Sauer's Conversation Grammar (4th edition).
Second Term.—Goldoni's Il Vero Amico.
Third Term.—Manzoni's I Promessi Sposi.

SECOND YEAR.

First Term.—Dante's Inferno (Clarendon Press Series).
Second and Third Terms.—Ebert's Handbuch der Italienischen National-Literatur; 1st Book, Italian Literature from its origin to the time of Lorenzo de' Medici.

Spanish.

FIRST YEAR.

First Term.—Montague's Manual Grammar in connection with exercises in writing.
Second and Third Terms.—Padre Isla's translation of Le Sage's Gil Blas and Moratin's El Si de las Niñas.

SECOND YEAR.

First Term.—Don Quijote.
Second Term.—Calderon's El Principe Constante.
Third Term.—Poema del Cid (Vollmöller's edition).

LITERATURE.

English Literature, and Rhetoric and General Literature, form a part of each of the General Courses of Study, either as required or elective work, the matter being distributed as shown in the tabulated statements of those courses.

I. *ANGLO-SAXON AND ENGLISH LITERATURE.*

A. Special Course.

FIRST YEAR.

Second Term.—Anglo-Saxon Grammar, the A.-S. Version of the Gospel according to St. John, and selections from the Homilies of Ælfric.

Third Term.—Selections from King Alfred's A.-S. Version of the History of Paulus Orosius, and of Boethius De Consolatione Philosophiæ, and selections from the A.-S. Chronicle.

SECOND YEAR.

First Term.—Selections from Layamon's Brut or Chronicle of Britain, the Ancren Riwle, and the Ormulum; the Proclamation of King Henry III, and selections from Robert of Gloucester's Chronicle.

Second Term.—Selections from Dan Michel's Ayenbite of Inwyt, or Remorse of Conscience, the Voiage and Travaile of Sir John Maundeville, Trevisa's Translation of Ralph Higden's Polychronicon, the Vision of William concerning Piers Plowman, Pierce the Ploughmans Crede, and the Wycliffite Versions of the Bible.

THIRD YEAR.

First Term.—Chaucer's Prologue to the Canterbury Tales, the Knightes Tale, and the Nonne Prestes Tale, Lectures on the Language and Versification of Chaucer.

Second and Third Terms.—The critical textual study of a play of Shakespeare, and Hale's Longer English Poems.

B. A General Course in English Literature.

First Term.—Lectures on the English language and literature, from Chaucer to Shakespeare, inclusive.

Second Term.—Lectures on the English language and literature, from Milton to Cowper, inclusive.

Third Term.—Lectures on English and American literature of the nineteenth century.

A syllabus of the course, prepared by the professor, presents to the student the leading points of each lecture, and the order of their treatment, designates the best editions of an author's works, or parts of them, that are generally accessible, and guides the student to such sources, philological, historical, biographical, critical, etc., as enable him to read to the best advantage.

Two lectures a week are given through one year.

It is sometimes found advisable to depart from the chronological order, and to begin with the lectures of the Second Term, as given above, or, sometimes of the Third.

II. *RHETORIC AND GENERAL LITERATURE.*

The *First Year* embraces the principles of elementary rhetoric, with practical exercises by the student, and recitations and reports of the lectures.

During the *Second Year*, the written exercises consist of themes, beginning with narration, and gradually advancing to description and exposition, these compositions being read in the class and corrected by the teacher. Elocution is also a required study during this year.

More advanced themes are assigned during the *Third Year*, and orations are also written and delivered before the class.

During the *Fourth Year*, the writing of essays and orations is continued, the themes embracing the topics of literary criticism and advanced rhetoric. Lectures are also given during the three terms on Literature, Literary Criticism, and Oratory. The exercises are on topics connected with the theory and application of rhetorical principles, the different periods of literature, and the leading representative essayists and orators.

In the *Third Year* advanced classes are formed in elocution and in the *Fourth Year* in rhetorical exercises from Shakespeare, Burke, Webster. and Demosthenes. During the last two years, opportunity is also given for oral discussion and extemporaneous speaking. No text-books are used, but collateral references are given and the lectures supplemented by courses of reading.

PHILOSOPHY.

Instruction in Philosophy begins the First Term of the *Third Year*. During that term it comprises a study of the physiology of the nervous system in relation to mental phenomena, and the nature and origin of knowledge. It is resumed the Third Term, the subject being logic, including the laws of thought, the formulæ of reasoning, and the various methods of proof and refutation, together with the methods of investigation and the grounds of certainty.

The subject during the First Term of the *Fourth Year* is the history of philosophy, and the progress of knowledge from its beginning in Greece to the present day, with criticisms on the methods of philosophy and transcendental logic; during the Second Term, moral philosophy, theories of morals, and the development of moral sentiments

HISTORY AND POLITICAL SCIENCE.

The Historical and Political Sciences are taught chiefly by lectures arranged in chronological sequence —Roman history being followed by the mediæval and modern history, the history of England, and the constitutional history of the United States.

The department of Political Science is intended to embrace all the important topics connected with political and social science. At present courses of lectures are delivered on Political Economy, and Constitutional and Municipal Law.

A Two Years Course in History and Political Science.

Not leading to a degree.

The requirements for admission are the same as for admission to the University, with the addition of Latin Grammar, and four books of Cæsar.

FIRST YEAR.

FIRST TERM.—Roman history, 5; psychology, 2; rhetoric 2, composition and elocution, 1; *elective*, 5; six lectures on hygiene.

SECOND TERM.—History of the Roman Empire, 5; moral philosophy, 2; rhetoric, 2, composition and elocution, 1; *elective*, 5.

THIRD TERM.—Mediæval history, 5; logic, 3; rhetoric, 2, composition and elocution, 1; *elective*, 5.

SECOND YEAR.

FIRST TERM.—Modern history, 3; American history, 2; English literature, 2; essays, 1; literature and oratory, 3; *elective*, 5.

SECOND TERM.—American history, 2; philosophy of history, 3; political economy, 2; English literature, 2; essays and orations, 1; literature and oratory, 3; *elective*, 5.

THIRD TERM.—American law, 5; English literature, 2; essays and orations, 1; extempore speaking and lectures on orators and oratory, 3; *elective*, 5.

On the completion of the course the student receives a certificate to that effect, signed by the President and the Dean of the Faculty of History and Political Science.

GENERAL COURSES OF STUDY.

The Course in Arts.

The Course in Arts, or Full Classical Course, leading to the degree of Bachelor of Arts, answers to the usual academic course of American colleges. The hours designated as *elective* may be devoted by the student to any subject he is qualified to pursue.

FIRST YEAR.

FIRST TERM.—Greek, 4; Latin, 4; geometry and conic sections, 5; rhetoric, 2; six lectures on hygiene.

SECOND TERM.—Greek, 4; Latin, 4; algebra, 5; rhetoric, 2.

THIRD TERM.—Greek, 4; Latin, 4; trigonometry 3; theory of equations, 2; rhetoric 2.

SECOND YEAR.

FIRST TERM.—Greek, 4; Latin, 4; composition and elocution, 1; *elective*, 6.

SECOND TERM.—Greek, 4; Latin, 4; composition and elocution, 1; *elective*, 6.

THIRD TERM.—Greek, 4; Latin, 4; composition and elocution, 1; *elective* 6.

THIRD YEAR.

FIRST TERM.—Psychology, 2; essays, 1; *elective*, 12.

SECOND TERM.—Political economy, 2; essays and orations, 1; *elective*, 12.

THIRD TERM.—Logic, 3; essays and orations, 1; *elective*, 12.

FOURTH YEAR.

FIRST TERM.—History of philosophy, 3; literature and oratory, 3; *elective*, 10.

SECOND TERM.—Moral philosophy, 2; literature and oratory, 3; *elective*, 10.

THIRD TERM.—Extempore speaking, and lectures on orators and oratory, 3; lectures of non-resident professors; *elective*, 10.

Students electing *Physics* are required to continue the study through one complete part of the subject, and those electing *Chemistry* are required to continue it through the two terms.

For the requirements for admission to the Course in Arts see page 33.

The Course in Literature.

The Course in Literature, leading to the degree of Bachelor of Literature, is based on Latin, without Greek, and designed for those who prefer studies of a specially literary nature.

FIRST YEAR.

FIRST TERM.—Geometry and conic sections, 5; Latin, 4; physiology, 3; rhetoric, 2; six lectures on hygiene.

SECOND TERM.—Algebra, 5; Latin, 4; Anglo-Saxon, 4; rhetoric, 2.

THIRD TERM.—Trigonometry, 3; theory of equations, 2; Latin, 4; botany, 3; Anglo-Saxon, 3.

SECOND YEAR.

FIRST TERM.—German, 5, and French, 3, *or* French, 5, and German, 3; Anglo-Saxon, 3; Latin, 4; composition and elocution, 1.

SECOND TERM.—German, 5, and French, 3, *or* French, 5, and German, 3; early English, 3; Latin, 4; composition and elocution, 1.

THIRD TERM.—German, 5, and French, 3, *or* French, 5, and German, 3: Latin, 4; early English, 2; composition and elocution, 1.

THIRD YEAR.

First Term.—Psychology, 2; Roman history, 5; Latin, modern languages, *or* science, 6; essays, 1; English literature, 2.

Second Term.—Political economy, 2; history of the Roman empire, 5; Latin, modern languages, *or* science, 6; essays and orations, 1; English literature, 2.

Third Term,—Logic, 3; mediæval history, 5; Latin, modern languages, *or* science, 6; essays and orations, 1; English literature, 2.

FOURTH YEAR.

First Term.—Modern history, 3; American history, 2; history of philosophy, 3; special literature, 2; literature and oratory, 3; Latin, modern languages, *or* science, 4.

Second Term.—American history, 2; philosophy of history, 3; moral philosophy, 2; special literature, 2; literature and oratory, 3; Latin, modern languages, *or* science, 4.

Third Term.—American law, 5; special literature, 2; extempore speaking, and lectures on orators and oratory, 3; Latin, modern languages, *or* science, 4; lectures of non-resident professors.

For the requirements for admission to the Course in Literature see page 33.

The Course in Philosophy.

The Course in Philosophy, leading to the degree of Bachelor of Philosophy, is based on Latin, without Greek, and designed for those who prefer studies of a philosophical nature.

FIRST YEAR.

First Term.—Geometry and conic sections, 5; Latin, 4; French *or* German, 5; rhetoric, 2; six lectures on hygiene.

Second Term.—Algebra, 5; Latin, 4; French *or* German, 5; rhetoric 2.

THIRD TERM.—Trigonometry, 3; theory of equations, 2; Latin, 4; French *or* German, 5; botany, 3.

SECOND YEAR.

FIRST TERM.—German *or* French, 3; zoology, lectures and aboratory work (vertebrates), 3; analytical geometry, 5; experimental mechanics, *or* heat, 3; composition and elocution, 1.

SECOND TERM.—German *or* French, 3; electricity and magnetism, *or* acoustics and optics, 3; chemical lectures, 3; zoology, lectures and laboratory work (invertebrates), 3; composition and elocution, 1; calculus, *or* science and modern languages, 5.

THIRD TERM.—German *or* French, 3; electricity and magnetism, *or* acoustics and optics, 3; chemical lectures, 3; composition and elocution, 1; calculus, *or* science and modern languages, 5.

THIRD YEAR.

FIRST TERM.—Psychology, 2; Roman history, science, mathematics, *or* languages, 5; geology, 3; heat, *or* experimental mechanics, 3; essays, 1; English literature, 2.

SECOND TERM.—Political economy, 2; history of the Roman empire, science, *or* languages, 5; descriptive astronomy, 3; acoustics and optics, *or* electricity and magnetism, 3; essays and orations, 1; English literature, 2.

THIRD TERM.—Logic, 3; mediæval history, science, *or* languages, 5; physical astronomy, 3; acoustics and optics, *or* electricity and magnetism, 3; essays and orations, 1; English literature, 2.

FOURTH YEAR.

FIRST TERM.—Modern history, 3; American history, 2; history of philosophy, 3; literature and oratory, 3; *elective*, 5.

SECOND TERM.—American history, 2; philosophy of history, 3; moral philosophy, 2; literature and oratory, 3; *elective*, 5.

THIRD TERM.—American law, 5; extempore speaking, and lectures on orators and oratory, 3; *elective*, 5; lectures of non-resident professors.

For the requirements for admission to the Course in Philosophy see page 33.

The Course in Science.

The Course in Science, leading to the degree of Bachelor of Science, is designed for those who wish to pursue studies relating chiefly to natural science, without Latin or Greek.

FIRST YEAR.

FIRST TERM.—Geometry and conic sections, 5; French, 5, and German, 3, *or* German, 5, and French, 3; rhetoric, 2; six lectures on hygiene.

SECOND TERM.—Algebra, 5; French, 5, and German, 3, *or* German, 5, and French, 3; rhetoric, 2.

THIRD TERM. — Trigonometry, 3; theory of equations, 2; French, 5, and German, 3, *or* German, 5, and French, 3; botany, 3.

SECOND YEAR.

FIRST TERM.—French *or* German, 3; zoology, lectures and laboratory work (vertebrates), 3; analytical geometry, 5; experimental mechanics, *or* heat, 3; composition and elocution, 1.

SECOND TERM.—French *or* German, 3; electricity and magnetism, *or* acoustics and optics, 3; chemical lectures, 3; zoology, lectures and laboratory work (invertebrates), 3; composition and elocution, 1; calculus, *or* science, 5.

THIRD TERM.—French *or* German, 3; electricity and magnetism, *or* acoustics and optics, 3; chemical lectures, 3; composition and elocution, 1; calculus *or* science, 5.

THIRD YEAR.

FIRST TERM.—Heat, *or* experimental mechanics, 3; organic chemistry, 2; geology, 3; English literature, 2; essays, 1; *elective*, six hours, of which at least three must be given to one of the following sciences: *botany*, *chemistry* or *zoology*.

SECOND TERM.—Acoustics and optics, *or* electricity and magnetism, 3; economic geology, 3; English literature, 2; essays and orations, 1; descriptive astronomy, 3; *elective*, four hours, which must be given to one of the following sciences: *botany*, *chemistry* (including *mineralogy*), or *zoology*.

THIRD TERM.—Acoustics and optics, *or* electricity and magnetism, 3; descriptive geometry, 3, drawing, 1; English literature, 2; essays and orations, 1; physical astronomy, 3; *elective*, four hours, which must be given to one of the following sciences: *botany*, *chemistry*, *geology*, or *zoology*.

FOURTH YEAR.

FIRST TERM.—Modern history, 3; American history, 2; *elective*, eleven hours, of which at least eight must be given to two of the following sciences; three or five hours may be devoted to each science taken: *botany*, *chemistry*, *geology*, *mathematics*, *physics*, or *zoology*.

SECOND TERM.—American history, 2; political economy, 2; *elective*, eleven hours, subject to the same conditions as in the first term of this year, except that chemistry may include mineralogy.

THIRD TERM.—Constitution of the United States, twelve lectures; *elective*, eleven hours, subject to the same conditions as in the first term of this year.

The elective hours not required for science in the *Third* and *Fourth Years*, may be devoted to either scientific, literary, historical, or philosophical subjects. In electing their studies in science for the *Third* and *Fourth Years* students are required to take at least the minimum amount, given throughout the year, of each science elected.

Students intending to take the physics of the *Fourth Year* must take the calculus of the *Second Year*; those intending to take geology of the *Fourth Year* must take blow-pipe determination of minerals previous to that year.

For the requirements for admission to the Course in Science see page 32.

The Course in Science and Letters.

The Course in Science and Letters, leading to the degree of Bachelor of Science, is designed for those who wish to pursue both scientific and literary studies, without Latin or Greek.

FIRST YEAR.

First Term.—Geometry and conic sections, 5; French, 5, and German, 3, *or* German, 5, and French, 3; rhetoric, 2; six lectures on hygiene.

Second Term.—Algebra, 5; French, 5, and German, 3, *or* German, 5, and French, 3; rhetoric, 2.

Third Term.—Trigonometry, 3; theory of equations, 2; French, 5, and German, 3, *or* German, 5, and French, 3; rhetoric, 2.

SECOND YEAR.

First Term.—French *or* German, 3; physiology, 3; zoology, lectures and laboratory work (vertebrates), 3; composition and elocution, 1; analytical geometry, *or* science and modern languages, 5.

Second Term.—French *or* German, 3; zoology, lectures and laboratory work (invertebrates), 3; chemical lectures, 3; composition and elocution, 1; calculus, *or* science and modern languages, 5.

Third Term.—French *or* German, 3; botany, 3; chemical lectures, 3; composition and elocution, 1; calculus, *or* science and modern languages, 5.

THIRD YEAR.

First Term.—Psychology, 2; Roman history, 5; geology, 3; heat *or* experimental mechanics, 3; English literature, 2; essays, 1.

Second Term.—Political economy, 2; history of the Roman empire, 5; acoustics and optics, *or* electricity and magnetism, 3; descriptive astronomy, 3; English literature, 2; essays and orations, 1.

Third Term.—Logic, 3; mediæval history, 5; acoustics and optics, *or* electricity and magnetism, 3; physical astronomy, 3; English literature, 2; essays and orations, 1.

FOURTH YEAR.

First Term.—Modern history, 3; American history, 2; history of philosophy, 3; literature and oratory, 3; *elective*, 5.

SECOND TERM.—American history, 2; philosophy of history, 3; moral philosophy, 2; literature and oratory, 3; *elective*, 5.

THIRD TERM.—American law, 5; extempore speaking, and lectures on orators and oratory, 3; *elective*, 5.

For the requirements for admission to the Course in Science and Letters see page 32.

THE UNIVERSITY LIBRARY.

The Library contains about forty thousand volumes besides fifteen thousand pamphlets. It is made up chiefly of the following collections: A selection of about five thousand volumes purchased in Europe, in 1868, embracing works illustrative of agriculture, the mechanic arts, chemistry, engineering, the natural sciences, physiology, and veterinary surgery; THE ANTHON LIBRARY, of nearly seven thousand volumes, consisting of the collection made by the late Professor Charles Anthon, of Columbia College, in the ancient classical languages and literature, besides works in history and general literature; THE BOPP LIBRARY, of about twenty-five hundred volumes, being the collection of the late Professor Franz Bopp, of the University of Berlin, relating to Oriental languages, Oriental literature, and comparative philology; THE GOLDWIN SMITH LIBRARY, of thirty-five hundred volumes presented in 1869 to the University by Professor Goldwin Smith, comprising chiefly historical works, and editions of the English and ancient classics—increased during later years by the continued liberality of the donor; the publications of the Patent Office of Great Britain, about three thou-

sand volumes, of great importance to the student of technology and to scientific investigators; THE WHITE ARCHITECTURAL LIBRARY, a collection of over one thousand volumes relating to architecture and kindred branches of science, given by President White; THE KELLY MATHEMATICAL LIBRARY, comprising eighteen hundred volumes and seven hundred tracts, presented by the late Honorable William Kelly, of Rhinebeck; THE CORNELL AGRICULTURAL LIBRARY, bought by the Honorable Ezra Cornell, chiefly in 1868; THE SPARKS LIBRARY, being the library of the late Jared Sparks, President of Harvard University, consisting of upwards of five thousand volumes and four thousand pamphlets, relating chiefly to the history of America; THE MAY COLLECTION, relating to the history of slavery and anti-slavery, the nucleus of which was formed by the gift of the library of the late Reverend Samuel J. May, of Syracuse.

The Library is a circulating one so far as the members of the Faculty are concerned, and a library of reference for students. Undergraduates have free access to a collection of cyclopædias, dictionaries, and works of reference in the various departments of study, but they apply to the librarians for other works desired. Graduate students are admitted to the alcoves.

GRADUATION.

Time Required for Graduation.

No person may receive a baccalaureate degree who has not spent four entire years in this University, except in case of one who has pursued elsewhere part of the studies of his course. Students admitted to advanced studies must, before the close of their first year, pass examinations on the previous work of the classes they enter.

Graduation Theses.

Each student is required, before taking any degree, to submit to the Faculty a satisfactory oration, poem, or essay on some subject in Science or Literature, and to deposit a copy in the University Library.

The Degree of Bachelor.

The degree of Bachelor of Science is conferred after the satisfactory completion of any one of the following courses: Science, Science and Letters, Chemistry and Physics, Mathematics, and Natural History. The particular course is specified in the diploma.

The degrees of Bachelor of Arts, of Literature, of Philosophy, of Agriculture, of Architecture, of Civil Engineering, and of Mechanical Engineering are conferred after the satisfactory completion of the corresponding courses. The degree of Bachelor of Veterinary Science is conferred only after the completion of a full course of four years in that department.

No person is allowed to receive more than one degree at the same Commencement.

Advanced Degrees.

Graduate courses of study leading to advanced degrees are provided for in the following general departments: Chemistry and Physics, History and Political Science, Ancient Classical Languages and Literature, Modern European Languages and Literature, Oriental Languages and Literature, Mathematics, Natural History, Comparative Philology, and Philosophy and Letters.

Any graduate intending to take an advanced degree must apply to the Faculty to be admitted as a candidate for that degree and signify the departments in which he wishes to prepare himself.

The MASTER's Degree in Arts or Science, is conferred on those who have taken the corresponding Bachelor's degree here, or elsewhere where the requirements for that degree are equal to those of this University, on the following conditions:

1. The candidate must spend at least one year in this University in a course of graduate study marked out for him by the Faculty, and must present a satisfactory thesis, and pass a satisfactory examination at the University on the course pursued.

2. The same degrees are conferred without residence on graduates of this University only, on conditions the same in all re-

spects as above, except that the degree is not given until three years after the Baccalaureate degree has been conferred.

3. Any person who has taken a Baccalaureate degree in this University may become a candidate for either of the above second degrees by passing satisfactorily such additional examinations as may be required for the corresponding first degree.

The degree of MASTER OF SCIENCE is conferred on graduates in the Course in Philosophy on the same conditions as if they had been graduated in the Course in Science.

The degree of CIVIL ENGINEER is conferred (1) on Bachelors of Civil Engineering, after two years of study and practice, on passing the requisite examinations and presenting a satisfactory thesis; (2) on those who have completed the five years course, at their graduation.

The degree of DOCTOR OF VETERINARY MEDICINE is conferred on those graduates who, after receiving the degree of Bachelor of Veterinary Science, have spent two years in additional study, and passed satisfactory examinations thereupon.

The degree of DOCTOR OF PHILOSOPHY is conferred on graduates of the University, and of other universities and colleges whose requirements for the Bachelor's degree are equal to those of this University, on the following conditions:

1. In order to become a candidate the applicant must have, over and above what is required for graduation in the Course in Philosophy, a knowledge of Greek equal to that required for admission to the Course in Arts.

2. The candidate must spend at least two years at this University in a course of study marked out by the Faculty as leading to this degree.

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(*b*) A knowledge of French and Ge
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(*c*) A knowledge of science, of lit
equal to that required for graduatio
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2. The candidate must spend at lea
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MISCELLANEOUS INFORMATION.

Terms and Vacations.

The academic year is divided into three terms, and there are three vacations.

Commencement Day is the third Thursday in June.

The First Term begins, after a vacation of thirteen weeks, on the Tuesday following the eleventh day of September, and ends on the Friday after the fourteenth day of December.

The Second Term begins on the Tuesday after the second day of January; except when, in leap-year, that Tuesday is the third day of January, in which case it begins on the Tuesday after the third. It ends the Friday after the twenty-third of March.

The Third Term begins on the second Saturday after the end of the Second Term; the instruction begins on the Monday following, and continues until Commencement.

For the terms and vacations of the present academic year, see the Calendar.

Inquiries Regarding Departments, Etc.

Persons wishing more detailed information than is given in the *Register* as to courses of study, methods of instruction, and the like, may address the professor in charge of the department concerned.

Directions to Candidates for Admission.

Candidates for admission will obtain permits for examination at the Registrar's office (in the south University building), and the results of examinations may be ascertained from the Registrar. Each person, upon admission, receives a copy of the "Rules for the Guidance of Students," and is thereafter supposed to be acquainted with its contents.

Registration.

The Registration Day for each term is indicated in the Calendar. On that day each student qualified for admission, whether previously a member of the University or not, is required to give notice of his studies for the term to the Registrar in person and receive a ticket of registration. No person is allowed to register at any other time, except by permission of the Faculty In order to join any class, the student must show his registration ticket to the instructor in charge.

Payments to the University.

The fee for tuition is twenty-five dollars a term, payable at the beginning of the term.

Tuition is free (1) to *State Students;* (2) to *Resident Graduates;* and (3) to students pursuing either of the prescribed courses in *Agriculture*, and *intending to complete* that course.

Every person taking laboratory practice in Chemistry, Physics, Zoology, or Entomology must deposit with the Treasurer security for the materials to be used in the laboratory. Students residing in the University buildings are required to pay their room-bills one month in advance. All members of the University are held responsible for any injury done by them to its property.

The fee for the Baccalaureate degree is *five* dollars; for any advanced degree, *ten* dollars.

Exercises of the Term.

A printed schedule of University exercises is issued at the beginning of each term. Most of the lectures and recitations occur between the hours of 8 a. m. and 1 p. m., from Monday to Friday inclusive. Every student is required to take the equivalent of fifteen hours of recitations a week, exclusive of military drill. Two and a half hours of laboratory practice, or three hours of drafting or shop-work, are regarded as the equivalent of one recitation.

Examinations.

The regular examinations in all studies are held at the end of each term. Failure at examination entails forfeiture of position in the class, or exclusion from the course, or, in some cases, from the University. The

Course-book affords the student an opportunity of preserving a record of his examinations; it is procurable at the bookstores, and the entries in it are made by the Registrar, or by the heads of the departments.

Expenses of Residence.

The following is an approximate estimate of the yearly expenses:

Tuition, $25 a term, - - - - - -	$ 75.00
Room, board, lights, and fuel, about - - -	240.00
Text-books, etc., - - - - - - - -	25.00
Total, - - - - - -	$340.00

Cascadilla Place is owned by the University, and is rented to professors and students.

The cost for board, rent of furnished room, fuel and lights at the Sage College, varies from $5.50 to $7.50 a week. Students occupying one of the most desirable rooms alone, pay $7.50 a week. If two occupy such a room together, the price is $6.25. Those occupying less desirable rooms, with two in a room, pay $5.50 a week each. The entire building is warmed by steam, and, in most cases, the sleeping apartment is separate from the study-room.

The expense of living in Ithaca varies, for board, room, fuel and lights, from four to ten dollars a week. In many cases students, by the formation of clubs, reduce their expenses to sums ranging from two and a half to three and a half dollars a week for board.

APPENDIX.

ENTRANCE EXAMINATION PAPERS.

English Grammar.

1. Write a short account of yourself containing information in regard to the following particulars: (*a*) name; (*b*) birth-place; (*c*) age; (*d*) school; (*e*) intended course of study in the University; (*f*) purpose in entering.

2. What is the name given to classes of words divided according to their office or use in the sentence?

3. Write an interrogative sentence and parse it.

4. What is meant by conjugating a verb?

5. Define *abstract*, *gender*, *declension*, *analysis*, and *comparison*, as used in grammar.

6. Why are certain pronouns called *personal?*

7. Mention the demonstrative pronouns with their plurals.

8. Name four ordinal adjectives.

9. State the difference between co-ordinating and subordinating conjunctions.

10. Write a sentence containing an adjective clause, drawing a line under the clause.

11. Write the meaning of the following verses in the simplest prose construction:

"Will fortune never come with both hands full,
But write her fair words still in foulest letters?
She either gives a stomach and no food,—
Such are the poor, in health; or else a feast,

And takes away the stomach,—such are the rich,
That have abundance and enjoy it not."

12. Illustrate by examples from the foregoing passage the meaning of the following terms: antecedent, case, conjunction, mood, preposition, subject, predicate, adverb.

13. Write a sentence in which the verb has a direct and an indirect object.

14. State the grammatical relation of each word in the following:

"Let me but bear your love, I'll bear your cares."

Geography.

1. Over what waters would you sail in going from Bombay to Lyons?
2. Over what waters would you sail from Yokohama to Paris?
3. What countries would one pass on the right in coasting from Honduras to Alaska?
4. What countries would one pass on the left in coasting from Calcutta to Behring's Straits?
5. Name the countries of Africa.
6. Bound Holland, Switzerland, France.
7. Bound Beloochistan, China Proper, Arabia.
8. What rivers flow into the Black Sea?
9. What rivers flow into the Mediterranean and its gulfs?
10. Describe the Nile, its origin, its course, and its outlet.
11. What rivers flow into the Baltic?
12. Name the inland seas and lakes of Asia.
13. Over what countries would a straight line from Brussels to Constantinople pass?
14. Over what countries would a straight line from Caracas to Montevideo pass?
15. Bound Ecuador, Bolivia, Uraguay.
16. Bound Utah, Kansas, Minnesota.
17. Over what States would a straight line from Tallahassee to St. Paul pass?
18. Describe the Gulf Stream and its course.

19. Describe the Arctic Current.
20. What is the average depth of oceans?
21. Explain the Trade winds and Monsoons.
22. State the various uses of mountains.
23. Describe the systems of mountain chains by which the surface of the earth is traversed.
24. Describe the table-lands of Asia.
25. Describe the Great Northern Plain of Europe.

Elementary Physiology.

EXCLUSIVE OF THE NERVOUS SYSTEM.

1. (*a*) Enumerate the digestive fluids, stating which is acid. (*b*) What is the general object of digestion? (*c*) What happens to milk in the stomach?

2. (*a*) Of what is the heart chiefly composed? (*b*) Give a diagram of the right side of the heart, showing the relative thickness of the walls, the position of the vessels, and valves, and naming all the parts.

3. (*a*) Which way does blood flow in the arteries of the arm? (*b*) In the veins of the arm? (*c*) Explain the pulse.

4. (*a*) Name the uses of the tongue. (*b*) Of the lips and cheeks. (*c*) What happens to the larynx when you swallow?

5. (*a*) State the normal composition of the air. (*b*) State the physical and chemical differences between the air inspired and the breath expired.

Arithmetic.

1. Define: a composite number, a factor, an abstract number, the cube root of a number, equation of payments.

2. What is the value of 50 lb. 8 oz. of gold at \$20.59$\frac{1}{4}$ per ounce?

3. Given the metre equal to 30.37 inches, reduce one mile to kilometres. Give the metric table of weights.

5. Divide $\frac{3}{8}$ of $7\frac{3}{4}$ by $\frac{4}{5}$ of $12\frac{1}{12}$. Prove the result by reducing the fractions to decimals and working the example anew.

5. A man said, "I will spend half my income, save a third of

it, and devote a fourth to business." His income was $780 a year. Point out his blunder, and divide his income rightly in the proportion intended by him.

6. How long must $125 be on interest at $7\frac{1}{2}$ per cent to gain $15?

7. Received 6 per cent. dividend on stock bought at 25 per cent. below par; what rate of interest did the investment pay?

8. Find the cube root of .726572699.

Elementary Algebra.

I. Define: The degree of a term, an algebraic fraction, the least common multiple of two polynomials, a rational quantity, a surd.

2. Divide $3x^2+6x+4x^4+1$ by $3-2x+2x^3$. Find the quotient to four terms, the remainder and the complete quotient.

3. Factor completely the expressions: x^6-16x^3+64, and $ax+2bx-3ay-6by$.

4. From the equations: $ax+by=c$ and $dx+ey=f$, eliminate y and find x:

a. By "addition or subtraction";

b By "substitution";

c. By "comparison."

5. Reduce to its simplest form:

$$-\frac{x-y}{\frac{1}{x}-\frac{1}{y}}+4(\tfrac{1}{2}xy)^2.$$

6. Reduce to their simplest forms:

$$\left(\frac{x^{-1}y}{x^{\frac{1}{2}}y^{-\frac{1}{2}}}\right)^{-\frac{1}{2}}\times(xy)^{0},\ \text{and}\ \frac{1}{2}\sqrt{6}:\sqrt{10+2^3\sqrt{15}}.$$

7. Find the cube root of

$777x^4y^2-531x^3y^3+444x^2y^4-144xy^5+64y^6+343x^6-441x^5y.$

8. Clear of radicals the equation

$$x^2-\sqrt{12-2x^2}=2.$$

solve it, and find the sum and the product of all the roots.

9. A boat's crew rows $3\frac{1}{2}$ miles down a river and back again in one hour and forty miuutes. The river has a current of two miles an hour. Find the rate at which the crew would row in still water.

Higher Algebra.

1. In an Arithmetical Progression, given the fundamental formulæ $l=a+(n-1)d$ and $s=\frac{1}{2}(a+l)n$; thence find the value of n in terms of s, l, and d.

2. Find a formula, and thence write a rule, for getting amount at compound interest when principal, rate, and time are given.

3. By the method of "Differences," find the 25th term, and the sum of 25 terms, of the series 1, 8, 27, 64, 125. . . .

4. By the "Binomial Theorem," develop $(a-2x)^{\frac{3}{4}}$ to 5 terms; and write the general term.

5. By the method of "Undetermined Co-efficients," develop $\frac{a+x}{(a-2x)^2}$ to 5 terms, and give the "scale" by which other terms are found.

6. Reduce 3.1416 to a continued fraction, and thence derive its successive approximate values.

7. Prove that $\log_a b \times \log_b a=1$.

If $\log 2=0.30103$, and $\log 3=0.47712$, find $\log 6$, $\log \frac{1}{60}$, $\log 216$, $\log \sqrt[3]{.6}$, $\log .25$.

8. If a be a root of the equation $x^n+Ax^{n-1}+\ .\ .\ .\ +L=0$, show that $x-a$ is a factor of $x^n-Ax^{n-1}+\ .\ .\ .\ +L$; and conversely.

9. State Horner's method of approximating to the incommensurable roots of an equation.

10. Given the equation $x^4-8x^3+24x^2-32x-84=0$, find the Sturm functions, and thence show how many real roots there are, and how many imaginary roots if any.

Plane Geometry.

1. Define: A surface, a plane angle, a perpendicular, the projection of a point upon a line, an isosceles triangle, a regular polygon, a square, a segment of a circle, a proportion, a demonstration.

2. If a perpendicular be erected at the middle of a straight line, then:

    (1) Every point in the perpendicular is equally distant from the extremeties of the line.

    (2) Every point without the perpendicular is unequally distant from the extremeties of the line.

3. In the same circle, or in equal circles, two angles at the centre are in the same ratio as their intercepted arcs. Prove for both commensurable and incommensurable arcs.

4. Two triangles are similar, when an angle of the one is equal to an angle of the other and the sides including these angles are proportional.

5. To construct a triangle equivalent to a given polygon.

6. The circumferances of two circles are to each other as their radii, and their areas are to each other as the squares of their radii.

If the areas of two circles be as 16 to 25, and the diameter of the first circle be twenty inches, what is the diameter of the other?

Solid Geometry and Conic Sections.

1. Define: The angle made by two lines not in the same plane, similar polyedrons, a spherical triangle, the ordinate of a point on a curve, the subtangent of a parabola.

2. If two angles not in the same plane have their sides respectively parallel and lying in the same direction, they are equal, and their planes are parallel.

3. Two triangular pyramids, having equvialent bases and equal altitudes, are equivalent.

4. The area of a spherical triangle is equal to the excess of the sum of its three angles over two right angles—the unit of angle being the right angle, and of area, the tri-rectangular triangle.

5. The volume of a sphere is equal to the area of its surface multiplied by one-third of its radius.

6. The lateral surface of a pyramid is greater than the base.

7. The tangent to a hyperbola bisects the angle between the lines drawn from the line of contact to the foci.

Trigonometry.

1. Define the secant and the cosecant of an angle. Find the value of the tangent of an angle in terms of each of the other functions.

2. Find the values of the functions of $(270° \pm \theta)$ in terms of the functions of θ.

3. Give the values of $\sin 2\theta$ and $\cos 2\theta$, and thence find the value of $\sin 3\theta$ in terms of $\sin \theta$.

4. Show that in any plane triangle $\cos A = \frac{b^2+c^2-a^2}{2bc}$.

5. Show that in any spherical triangle.

$$\cos \tfrac{1}{2}A = \sqrt{\left(\frac{\sin s \sin (s-a)}{\sin b \sin c}\right)}, \text{ wherein } 2s = a+b+c.$$

6. Show how to solve a spherical right triangle, given one angle and the opposite side.

7. Solve the plane right triangle, given an angle, 64° 12′ 37″, and the opposite side, 741.53.

8. Solve the spherical oblique triangle, given two sides, 70° 13′ and 139° 12″, and the included angle, 60°.

French.

Translate the following sentences in their order into French, writing very plainly on only one side of the paper, and place your name on every half sheet.

1. My brother and sister are very good. Is it not so? They flatter themselves that they are much loved.

2. Yes, they have the beauty of youth and they have good health, and every body likes them.

3. Which are the books you bought this morning? I have

been told that you mean to read them and copy portions of them.

4. I did not buy any, but I borrowed two. There they are. One is new, the other old. I like this one, but not that. Which is the better?

5. Are you going to give me one or must I buy it? I know you very well, but do not know what you are going to do.

6. I am afraid that my music-teacher is coming and that I must learn my lesson. No, it is not he. He wears a white silk hat and black gloves.

7. Though you have no experience and are having many difficulties, I do not believe that you are losing courage.

8. This morning it was necessary for her to sew her calico dress which she had torn, and now I must go and take her to her brother's.

9. This is the only bonnet I have. Do you think that my mother wishes me to go to church so dadly dressed?

10. People should go to church to pray and not to show their clothes.

11. My brother and I were going to our uncle's unless it rained. If it rains this evening we shall stay there.

12. Before you start I will give you some stockings. You have no new ones. It is cold weather and you will be cold. This room is cold now.

13. He is a painter. We will make him paint a picture of your library, and you can pay him next week when you receive your money from General B.

14. We shall leave Ithaca at a quarter before seven in the morning, and I must now go to bed for I shall have to rise at ten minutes past six. Good-bye.

Give the 2d pers. plu. of the imp. ind., of the fut., and of the imp. sub. of the following:

aller,	coudre,	dire,	prendre,
acquérir,	ceindre,	faire,	resoudre,
bouillir,	croire,	mettre,	taire.

Translate the following passages from Voltaire's Charles XII, giving the principal parts of the irregular verbs, and parsing such words as are marked.

* * * * * * *

* * * * * * *

German.

I.

Translate:

Der Ritter fuhr in seiner Erzählung fort: "Ich wäre mit meinem scheuen Pferde fast gegen Baumstämme und Aeste angerannt; es triefte vor Angst und Erhitzung, und wollte sich doch noch immer nicht halten lassen. Zuletzt ging es gerade auf einen steinigen Abgrund los; da kam mir's plötzlich vor, als werfe sich ein langer, weisser Mann dem tollen Hengste quer vor in seinem Weg; der entsetzte sich davor und stand; ich kriegte ihn wieder in meine Gewalt, und sah nun erst, dass mein Retter kein weisser Mann war, sondern ein silberheller Bach, der sich neben mir von einem Hügel herunterstürtzte, meines Rosses Lauf ungestüm kreuzend und hemmend."

1. Give the principal parts of *fuhr fort*, *angerannt*, *lassen*, *ging los*, *kam vor*, *werfe*, *entsetzte*, *stand*, *sah*, *herunterstürtzte.*
2. Give synopsis throughout the active and passive, indicative, subjunctive and conditional, third, singular, of *werfen.*
3. Where is *wäre angerannt* found? why subjunctive? Why is *werfe* subjunctive? why present? why not transposed?
4. What kind of subordinate sentence is introduced by *als*, *dass*, *der?*
5. Explain the use of *davor*, *sondern*, *hemmend.*
6. What are the different ways of arranging a German sentence, and when is each order of arrangement used? Illustrate by sentences in this passage.

II.

Translate:

Berglied.

Am Abgrund leitet der schwindlichte S t e g,
Er führt zwischen Leben und Sterben;
Es sperren die Riesen den einsamen Weg
Und drohen dir ewig Verderben;
Und willst du die schlafende Löwin nicht wecken,
So wandle still durch die Strasse der Schrecken.

Es scwebt eine B r ü c k e, hoch über den Rand
Der furchtbaren Tiefe gebogen,

Sie ward nicht erbauet von Menschenhand,
Es hätte sich's keiner verwogen;
Der Strom braust unter ihr spät und früh,
Speit ewig hinauf, und zertrümmert sie nie.

Es öffnet sich schwarz ein schauriges Thor,
Du glaubst dich im Reiche der Schatten,
Da thut sich ein lachend Gelände hervor,
Wo der Herbst und der Frühling sich gatten;
Aus des Lebens Mühen und ewiger Qual
Möcht ich fliehen in dieses glückselige Thal.

1. Give, with the definite article, the nominative singular, genitive singular, and nominative plural of the following nouns: *Riesen*, *Verderben*, *Löwin*, *Rand*. *Thor*, *Gelände*, *Frühling*, *Thal*.

2. Inflect in German: good man, a good child, the good woman.

3. Tell the derivation of the following words, showing the special meaning of each derivative: *Steg*, *wecken*, *Tiefe*, *Menschen* in *Menschenhand*, *Gelände*, *Frühling*, *glückselige*.

4. Give the English cognates, found by Grimm's Law, in the following words: *leitet*, *sterben*, *schwebt*, *ward*, *schwarz*, *Thor*, *glaubt*, *thut*, *Thal*.

III.

Translate into German:

During[1] an overflow[2] of the Adige[3] the bridge[4] of Verona was swept away[5] by the force[6] of the current,[7] but there was left[8] one of the middle[9] arches[10] on which was[11] a house which was inhabited[12] by the tollgatherer[13] with his family.[14] The people[15] gathered[16] on the shore[17] could distinctly[18] hear the shrieks-for-help[19] of the distressed[20] family. The Count[21] of Spolverini, who was in-the-midst-of[22] the crowd,[23] promised[24] the one who would rescue[25] the poor family from sure[26] destruction[27] a reward[28] of five hundred dollars. At-this-moment[29] a young peasant[30] came along,[31] who sprang into a boat[32] and with great exertions[33] succeeded[34] in reaching[35] the house.

1. *bei*. 2. *Ueberscwemmung*. 3. *die Etsch*. 4. *die Brücke*. 5. *hinwegreissen*. 6. *die Gewalt*. 7. *die Fluth*. 8. *stehen*. 9.

mittler. 10. *der Bogen.* 11. *sich befinden.* 12. *bewohnen.* 13. *Zolleinnehmer.* 14. *die Familie.* 15. *das Volk.* 16. *versammeln.* 17. *das Ufer.* 18. *deutlich.* 19. *das Geschrei.* 20. *unglücklich.* 21. *Graf.* 22. *mitten in.* 23. *das Gedränge.* 24. *versprechen.* 25. *erretten.* 26. *sicher.* 27. *Untergang.* 28. *Belohnung.* 29. *da.* 30. *Bauer.* 31. *herbeikommen.* 32. *das Boot.* 33. *Austrengung.* 34. *gelingen.* 35. *erreichen.*

Latin.

Cæsar.

Translate (at sight):

—Hostes postero die multo maioribus coactis copiis castra oppugnant, fossam complent. Eadem ratione qua pridie ab nostris resistitur. Hoc idem reliquis deinceps fit diebus. Nulla pars nocturni temporis ad laborem intermittitur; non aegris, non vulneratis facultas quietis datur. Quaecumque ad proximi diei oppugnationem opus sunt, noctu comparantur. B. G., v, 40.

Give the reason for the cases of *multo*, *copiis*, *temporis;* the principal parts of *resistitur.*

Vergil.

Translate:

"Nate dea vosque haec' inquit "cognoscite, Teucri,
et mihi quae fuerint iuvenali in corpore vires
et qua servetis revocatum a morte Dareta."
dixit et adversi contra stetit ora iuvenci,
qui donum adstabat pugnae, durosque reducta
libravit dextra media inter cornua caestus,
arduus, effractoque inlisit in ossa cerebro.
sternitur exanimisque tremens procumbit humi bos.

—Æn., v, 474–481.

With what meaning is the ablative sometimes possible after *in* denoting motion (compare *ossa*, next to last line). Is this construction a violation of the principles of the language?

Divide the last three verses into feet, and give the so-called "rules" for the length of all final and penultimate syllables in the next to the last line. Is the statement true that "a vowel

before two consonants, or a double consonant, is long by position"? Justify your answer. What is the metrical effect of the peculiar ending of the last line?

Translate:

Incipe Maenalios mecum, mea tibia, versus.
Mopso Nisa datur: quid non speremus amantes?
iungentur iam grypes equis, aevoque sequenti
cum canibus timidi venient ad pocula dammae.
Mopse, novas incide faces: tibi ducitur uxor;
sparge, marite, nuces: tibi deserit Hesperus Octam.

—Ecl., viii, 25–30.

Explain the customs alluded to in *incide faces*, *sparge nuces*. How do you account for the use in the Eclogues of Greek scenery and Greek imagery in connection with Roman subjects?

Indicate as well as you can by English spelling how a Roman would have prónounced the next to the last line.

Cicero.

Translate:

Quam ob rem sive hoc statueritis, dederitis mihi comitem ad contionem populo carum atquae iucundum, sive Silani sententiam sequi malueritis, facile me atque vos crudelitatis vituperatione populus Romanus exsolvet; atque obtinebo eam multo leniorem fuisse. Quamquam, patres conscripti, quae potest esse in tanti sceleris immanitate punienda crudelitas? ego enim de meo sensu iudico. Nam ita mihi salva re publica vobiscum perfrui liceat, ut ego, quid in hac causa vehementior sum, non atrocitate animi moveor—quis est enim me mitior?—sed singulari quadam humanitate et misericordia. Videor enim mihi videre hanc urbem, lucem orbis terrarum atque arcem omnium gentium, subito uno incendio concidentem.

—Cat., iv, 6.

Explain distinctly the meaning of the mood and tense of *statueritis*, *iudico*, *liceat*; of the case of *vituperatione*. Give the principal parts of *statueritis*, *malueritis*, *exsolvet*. Compare *facile*. Explain fully the formation of the word *sententia*.

What are the two opinions discussed by Cicero, and who is

the representative of the former? What sentence marks the transition from the non-committal "sive—sive" to the urging of Cicero's own view? What was Cicero's position in the state at this time?

Translate (at sight):

Multa praetereo eaque praeclara; ad singulare enim M. Antonii factum festinat oratio. Dictaturam, quae iam vim regiae potestatis obsederat, funditus ex re publica sustulit, de qua ne sententias quidem diximus: scriptum senatus consultum, quod fieri vellet, attulit, quo recitato auctoritatem eius summo studio secuti sumus eique amplissimis verbis per senatus consultum gratias egimus.

Lux quaedam videbatur oblata, non modo regno, quod pertuleramus, sed etiam regni timore sublato, magnumque pignus ab eo rei publicae datum, se liberam civitatem esse velle, cum dictatoris nomen, quod saepe iustum fuisset, propter perpetuae dictaturae recentem memoriam funditus ex re publica sustulisset.

—PHIL., i, 1–2.

What is the meaning of the mood and tense of *vellet*, *velle*, *sustulisset*? Give the synopsis of these verbs in the first person plural active. Explain the case of *quo*, *dictatoris*; the formation of *funditus*.

COMPOSITION.

Translate into Latin:

Had Cicero assented to the opinion of a certain Roman, he would indeed have been saved from unjust charges, but Rome could hardly have escaped. Do you not agree with me that, after the killing of the conspirators, partly at Rome and partly on the field of battle, the condition of the city was much better than if the guilty[1] men had either been forgiven[2] or lightly punished.[3]

[1] Use *noceo*. [2] *Ignosco*. [3] *Poenam ab . . . expetere*.

HISTORY.

Sketch briefly the struggle between Rome and Carthage. Why was it natural that Sicily should be the first place of meeting?

Show the wisdom of Rome's method of dealing with conquered provinces.

Sketch briefly the political activity of Cicero after the assassination of Cæsar.

Greek.

[N.B.—Write the Greek words *with their accents*].

I. Prose.

Translate any *two* of the following three passages (of which it is not supposed that you have previously seen more than one); and answer *all* the questions.

1.

Πεμπόντων δὲ πρέσβεις ἐς Λακεδαίμονα, τῶν μὲν τριάκοντα ἐξ Ἐλευσῖνος, τῶν δ' ἐν καταλόγῳ ἐξ ἄστεος, καὶ βοηθεῖν κελευόντων, ὡς ἀφεστηκότος τοῦ δήμου ἀπὸ Λακεδαιμονίων, Λύσανδρος, λογισάμενος ὅτι οἷόν τε εἴη ταχὺ ἐκπολιορκῆσαι τοὺς ἐν τῷ Πειραιεῖ κατά τε γῆν καὶ κατὰ θάλατταν, εἰ τῶν ἐπιτηδείων ἀποκλεισθείησαν, ξυνέπραξεν ἑκατόν τε τάλαντα αὐτοῖς δανεισθῆναι, καὶ αὐτὸν μὲν κατὰ γῆν ἁρμοστήν, Λίβυν δὲ τὸν ἀδελφὸν ναυαρχοῦντα ἐκπεμφθῆναι. καὶ ἐξελθὼν αὐτὸς μὲν Ἐλευσῖνάδε, ξυνελέγετο ὁπλίτας πολλοὺς Πελοποννησίους· ὁ δὲ ναύαρχος κατὰ θάλατταν ἐφύλαττεν, ὅπως μηδὲν εἰσπλέοι αὐτοῖς τῶν ἐπιτηδείων· ὥστε ταχὺ πάλιν ἐν ἀπορίᾳ ἦσαν οἱ ἐν Πειραιεῖ, οἱ δ' ἐν τῷ ἄστει πάλιν αὖ μέγα ἐφρόνουν ἐπὶ τῷ Λυσάνδρῳ.

—Xen. *Hellenica.* II, iv, 28 (Goodwin's Reader).

Give the principal parts of *πεμπόντων, ἀφεστηκότος, ἐξελθών, ξυνελέγετο, εἰσπλέοι.* Give synopses of *λογισάμενος* and *ἐκπεμφθῆναι,* through all the moods. Inflect *ἐφρόνουν.*

How had "the Thirty" come into power, and by what means were they deposed?

2.

Ἀποκρίνεται ὁ Χειρίσοφος· Βλέψον, ἔφη, πρὸς τὰ ὄρη, καὶ ἰδὲ ὡς ἄβατα πάντα ἐστί· μία δ' αὕτη ὁδὸς ἣν ὁρᾷς

ὀρθία, καὶ ἐπὶ ταύτῃ ἀνθρώπων ὁρᾶν ἔξεστί σοι ὄχλον τοσοῦτον, οἳ κατειληφότες φυλάττουσι τὴν ἔκβασιν. ταῦτ' ἐγὼ ἔσπευδον, καὶ διὰ τοῦτό σε οὐχ ὑπέμενον, εἴ πως δυναίμην φθάσαι πρὶν κατειλῆφθαι τὴν ὑπερβολήν· οἱ δ' ἡγεμόνες οὓς ἔχομεν οὔ φασιν εἶναι ἄλλην ὁδόν. ὁ δὲ Ξενοφῶν λέγει· Ἀλλ' ἐγὼ ἔχω δύο ἄνδρας. ἐπεὶ γὰρ ἡμῖν πράγματα παρεῖχον, ἐνηδρεύσαμεν, ὅπερ ἡμᾶς καὶ ἀναπνεῦσαι ἐποίησε, καὶ ἀπεκτείναμέν τινας αὐτῶν, καὶ ζῶντας προὐθυμήθημεν λαβεῖν αὐτοῦ τούτου ἕνεκα, ὅπως ἡγεμόσιν εἰδόσι τὴν χώραν χρησαίμεθα.

—Xen. *Anabasis*, IV, I, 20.

Decline *ὄρη* through the singular, and *ἔκβασιν* through the plural. Give the nominative sing. and plur., through all genders, of *ταύτῃ*. Point out the *enclitics* in this passage.

3.

Κῦρος γὰρ μέχρι μὲν δώδεκα ἐτῶν ἢ ὀλίγῳ πλεῖον ταύτῃ τῇ παιδείᾳ ἐπαιδεύθη, καὶ πάντων τῶν ἡλίκων διαφέρων ἐφαίνετο καὶ εἰς τὸ ταχὺ μανθάνειν ἃ δέοι καὶ εἰς τὸ καλῶς καὶ ἀνδρείως ἕκαστα ποιεῖν. ἐκ δὲ τούτου τοῦ χρόνου μετεπέμψατο Ἀστυάγης τὴν ἑαυτοῦ θυγατέρα καὶ τὸν παῖδα αὐτῆς· ἰδεῖν γὰρ ἐπεθύμει, ὅτι ἤκουεν αὐτὸν καλὸν κἀγαθὸν εἶναι. ἔρχεται δ' αὐτή τε ἡ Μανδάνη πρὸς τὸν πατέρα καὶ τὸν Κῦρον τὸν υἱὸν ἔχουσα.

—Xen. *Cyropædia*, I, III, 1.

II. Composition.

[The Greek words may be found in the second prose-passage above.]

The guide said there was no other way out of the country, and if we should not make haste by this, the men would kill some of us.

III. Poetry.

Translate:

Ὢ πόποι! ἦ μέγα πένθος Ἀχαιΐδα γαῖαν ἱκάνει·
ἦ κεν γηθήσαι Πρίαμος, Πριάμοιό τε παῖδες,
ἄλλοι τε Τρῶες μέγα κεν κεχαροίατο θυμῷ,

εἰ σφῶϊν τάδε πάντα πυθοίατο μαρναμένοιϊν,
οἳ περὶ μὲν βουλὴν Δαναῶν, περὶ δ᾽ ἐστὲ μάχεσθαι.
ἀλλὰ πίθεσθ᾽· ἄμφω δὲ νεωτέρω ἐστὸν ἐμεῖο.
ἤδη γάρ ποτ᾽ ἐγὼ καὶ ἀρείοσιν ἠέπερ ὑμῖν
ἀνδράσιν ὡμίλησα, καὶ οὔποτέ μ᾽ οἵγ᾽ ἀθέριζον.
—*Iliad*, I, 254–261.

Translate:

Ἀλλ᾽ ὅτε δὴ Τρώεσσιν ἐν ἀγρομένοισιν ἔμιχθεν,
στάντων μὲν Μενέλαος ὑπείρεχεν εὐρέας ὤμους,
ἄμφω δ᾽ ἑζομένω, γεραρώτερος ἦεν Ὀδυσσεύς·
ἀλλ ὅτε δὴ μύθους καὶ μήδεα πᾶσιν ὕφαινον,
ἤτοι μὲν Μενέλαος ἐπιτροχάδην ἀγόρευεν,
παῦρα μέν, ἀλλὰ μάλα λιγέως· ἐπεὶ οὐ πολύμυθος,
οὐδ᾽ ἀφαμαρτοεπής, ἢ καὶ γένει ὕστερος ἦεν.
ἀλλ᾽ ὅτε δὴ πολύμητις ἀναΐξειεν Ὀδυσσεύς,
στάσκεν, ὑπαὶ δὲ ἴδεσκε, κατὰ χθονὸς ὄμματα πήξας,
σκῆπτρον δ᾽ οὔτ᾽ ὀπίσω οὔτε προπρηνὲς ἐνώμα,
ἀλλ᾽ ἀστεμφὲς ἔχεσκεν, ἀΐδρεϊ φωτὶ ἐοικώς·
φαίης κε ζάκοτόν τέ τιν᾽ ἔμμεναι, ἄφρονά τ᾽ αὔτως·
ἀλλ᾽ ὅτε δὴ ῥ᾽ ὄπα τε μεγάλην ἐκ στήθεος ἵει,
καὶ ἔπεα νιφάδεσσιν ἐοικότα χειμερίῃσιν,
οὐκ ἂν ἔπειτ᾽ Ὀδυσῆΐ γ᾽ ἐρίσσειε βροτὸς ἄλλος·
οὐ τότε γ᾽ ὧδ᾽ Ὀδυσῆος ἀγασσάμεθ᾽ εἶδος ἰδόντες.
—*Iliad*, III, 209–224.

Scan the last line of the first passage, marking the quantity of every syllable. Give the Attic equivalents of the following forms: *πυθοίατο, ἔμιχθεν, ὑπείρεχεν.* Where formed (tense, mood, voice), and from what verbs, are *γηθήσαι, κεχαροίατο, ἀγρομένοισιν?*

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G.L.T. Smith, B.C.E., (C.E., '74)
M. A. Smith, B.C.E.
R. G. H. Speed, Ph.B.
R. Taft, B.S.
W. H. Tallmadge, A.B
C. E. Van Cleef, B.S.
W. De L. Wilson, A.B.

Graduated in 1872.

A. M. Baldwin, Ph.B.
M. C. Bean, B.C.E.
C. H. Blair, A.B., (A.M., '76).
D. W. Bowman, B.C.E.
E. L. Brady, B.S.
G. F. Breed, Ph.B.
H. S. Buffum, B.S.
J. M. Chase, B.S.
I. E. Clark, B.C.E.
A. C. Clement, B.S.
A. W. Clinton, B.S.
D. Colburn, B.C.E.
M. T. Conklin, B.S.
*H. E. Copeland, Ph. B., (M.S., '75).
C. L. Crandall, B.C.E., (C.E., '76).
C. S. Crofoot, Ph.B.
Gram Curtis, B.C.E.
D. M. Darrin, B.S.
L. A. Foster, B.S.
F. W. Frost, B.C.E.
A. N. Fuller, B.S.
W. Harkins, B.S., (B.Lit., '73).
R. Headly, B.S.
H. C. Henderson, B.C.E.
I. N. L. Heroy, B.S.
W. E. Holcomb, B.S.
F. Holden, A.B.
R. B. Howland, B.C.E.
J. H. Hurd, B.S.
E. W. Hyde, B.C.E., (C.E.'74).
G. A. Iselin, B.S.
D. S. Jordan, M.S.
L. F. Judson, B.S.
M. Kellogg, B.S.
J. B. Lawrence, Ph.D.
W. N. B. Lawton, Ph.B.
W. B. Leach, B.S.
J. W. Mack, B.S.
J. T. McCollum, B.S.
T. J. McConnon, B.S.
E. E. McElroy, B.S.
F. D. Nash, B.S.
E. Nicoll, B.S.
W. H. Niles, B.S.
A. Osborn, A.B.
D. M. Page, B.S.
M. G. Peters, B.S.
A. C. Pike, B.S.
G. W. Pitts, B.S.
*H. G. Pollock, B.S
C. S. Price, B.C.E.
A. L. Rader, Ph.B.
A. Rogers, B.C.E.
D. E. Salmon, B.V.M., (D.V.M. '76).

T. Sanderson, A.B.
W. I. Scott, B.S.
G. P. Serviss, B.S.
C. B. Sill, B.C.E.
*C. Smith, B.S.
L. P. Smith, B.S., (Agr.B.,'74).
M. G. Stolp, B.C.E.
S. P. Thomas, B.C.E.
J. E. Van De Carr, B.S.
J. De W. Warner, Ph.B.
A. C. Weeks, B.S.
S. N. Williams, B.C.E.
E. V. Wilson, B.S.
T. H. Wolford, B.S.
W. J. Youngs, B.S.

Graduated in 1873.

C. F. Allen, B.C.E.
H. Altman, B.S.
R. Anderson, B.M.E.
J. C. Averill, B.S.
A. B. Aubert, B.S.
R. Bacon, B.S.
E. H. Bartley, B.S.
S. F. Belknap, B.S.
H. E. Blake, B.C.E.
L. G. Boies, A.B.
J. W. Boothby, B.S.
S. W. Brown, B.S., (C.E., '76).
Frank D. Carpenter, B.C.E.
F. H. Carver, B.S.
A. B. Cauldwell, B.S.
J. Chamberlin, B.S.
I. P. Church, B.C.E.
J. T. Cothran, A.B.
W. H. Denham, B.S.
O. A. Derby, B.S., (M.S., '74).
G. Devin, B.C.E.
*E. T. Diefendorff, B.S.
E. G. Donaldson, B.Lit.
G. F. Dudley, B.S.
W. F Duncan, B.S.
E. S. Eastman, Ph.B.
L. Elsbree, A.B.
L. Everett, B.S.
J. B. Ewell, B.S.
L. Falkenau, B.C.E., (C.E., '77).
F. B. Ferriss, B.S.
P. D. Finnegan, A.B.
C. Finster, A.B.
N. K. Foster, B.S.
J. Frankenheimer, Ph.B.
*M. R. Frazer, A.B.
A. Gridley, B.S.
F. N. Hagar, A.B.
F. W. Halsey, B.S.
G. W. Harris Ph.B.
A. C. Harwick, B.S.
J. W. Hill, B.M.E.
G. W. Horner, B.C.E.
E. M. Howard, B.S.
A. T. Hyde, B.C.E.
H. C. Johnson, A.B.
*F. H. Jones, B.Lit.
C. S. Joy, A.B.
F. W. Kelley, A.M., (Ph.D.,'74).
W. L. Klein, B.S.
F. J. Knight, B.C.E.
J. M. Knowles, B.S.
*D. E. Kohler, A.B.
C. Y. Lacy, Agr.B.
C. F. Lane, A.B.
D. T. Lawson, B.C.E.
W. Leland, B.S.
C. E. Lipe, B.M.E.

R. H. Lockwood, B.C.E.
G. F. Lyman, B.C.E.
D. W. J. Mesick, B.S.
J. L. Moffatt, B.S.
J. G. Moore, A.B.
G. C. Morehouse, B.S.
W. T. Morris, B.S.
J. G. Newkirk, A.B.
C. D. Page, B.S.
R. Parmely, B.S.
F. Parson, B.C.E.
G. E. Patrick, B.S., (M.S., '74).
G. H. Phelps, BS.
*K. Preston, B.C.E.
F. W. Proctor, B.S.
F. J. Root, B.C.E.
J. R. Schoonover, Arch.B.
E. H. Scofield, A.B.
J. F. Seybolt, B.S.
M. C. Sharp, Ph.B.
M. A. Shotwell, Ph.B.
C. D.W. Smith, B.S., (M.S., '75).
C. L. Smith, B.S.
S. Smith, B.S.
W. H. Smith, A.B.
H. L. Sprague, B.S.
W. L. Sprague, A.B.
H. D. Stevens, B.S.
*G. A. Tilly, B.C.E.
W. Tinning, B.S.
*J. H. Tompkins, B.C.E.
G. B. Turner, B.S.
M. W. Van Auken, A.B.
C. F. Wheelock, B.S.
T. S. White, B.C.E.
T. Worthington, Ph.B.

Graduated in 1874.

F. B. Alexander, B.C.E.
G. Berry, Arch.B., (Arch., '76).
N. W. Cady, Ph.B.
C. W. Candee, B.S.
J. D. Case, B.S.
J. F. Cluck, A.B.
J. H. Comstock, B.S.
F. W. Cooper, Arch.B.
O. H. P. Cornell, C.E.
J. A. Dobroluboff, B.C.E.
W. R. Dudley, B.S., (M.S.,'76).
H. L. R. Fairchild, B.S.
W. R. Fitch, B.C.E.
S. P. Fleming, A.B.
W. H. Flint, A.B.
R. B. Foster, B.C.E., (C.E.,'77).
L. M. Fulton, B.S.
W. Green, B.C.E.
H. M. Gillett, B.S.
T. Hampson, Lit.B.
J. T. Hay, B.S.
B. A. Hayes, Lit. B.
L. F. Henderson, Ph.B.
H. M. Hibbard, B.C.E.
H. L. House, A.B.
J. T. Hurd, B.S.
W. H. Janney, B.C.E.
E. F. P. Jordao, B.C.E.
W. A. Kellerman, B.S.
H. M. Kennedy, Lit.B.
B. W. Law, Arch.B.
C. H. Lay, B.C.E.
W. R. Lazenby, Agr.B.
H. G. Northrup, B.C.E.
J. H. Peirce, B.S.
E. M. Pitts, B.S., (M.S., '75).
C. A. Preston, B.S.
C. H. Ramsay, B.S.

E. O. Randall, Ph.B.
W. M. J. Rice, Arch.B.
H. B. Robinson, B.C.E.
B. E. Shear, Arch.B.
G. S. Sheppard, B.S.
W. M. Smith, B.S.
W. N. Smith, B.M.E.
C. W. Soulby, B.S.
J. H. Southard, B.S.
A. C. Standart, B.S.
J. L. Stone, Agr.B.
W. Swaty, B.S.
W. P. Thompson, B.S.
L. P. Tier, B.C.E.
S. E. Todd, Arch.B.
F. C. Tomlinson, B.C.E.
G. B. Upham, B.S.
J. D. Upham, B.S.
M. Van Cleef, B.S.
G. R. Van De Water, B.S.
F. W. Warthorst, B.C.E.
C. W. Wasson, B.C.E.
R. H. Wiles, B.S.
G. T. Winston, Lit.B.
C. C. Wood, B.S.
F. C. Wood, B.S.

Graduated in 1875.

W. O. Bates, Ph.B.
A. A. Beattie, B.M.E.
H. P. Bellows, B.S., (M.S., '79).
E. T. Betts, B.S.
A. R. Bradford, B.S.
A. W. Bulkley, Arch.B.
S. J. Bunting, B.M.E.
C. F. Burt, B.S.
S. W. Carpenter, Ph.B.
I. N. Cook, B.C.E.
E. R. Corson, B.S.
V. L. Davy, A.B.
J. W. Dean, B.S.
O. W. Ferguson, B.C.E.
G. H. Fitch, B.S.
E. L. B. Gardiner, B.M.E.
E. George, B.C.E.
A. R. Gillis, B.M.E.
A. C. Greene, B.C.E.
C. S. Harmon, B.S.
O. Harris, B.S.
F. Hatch, A.B.
F. H. Hiscock, A.B.
D. R. Horton, B.S.
I. E. Hutton, Arch.B.
E. Jackson, B.S.
C. C. King, Arch.B.
H. B. Knight, A.B.
M. H. Ladd, A.B.
M. D. Makepeace, B.C.E.
G. S. Moler, B.M.E.
J. T. Newman, Ph.B.
E. L. Nichols, B.S.
P. H. Perkins, B.C.E.
E. D. Preston, B.C.E., (C.E., '80).
E. J. Preston, B.S.
H. H. Roberts, Ph.B.
E. K. Rossiter, Arch.B.
H. W. Sackett, A.B.
A. F. Shaw, B.S.
F. W. Simonds, B.S., (M.S., '76).
F. P. Smith, B.S.
F. P. Stevens, B.S.
W. M. Sturges, Agr.B.
G. Tatnall, B.C.E.
J. J. Thomas, A.B., (A.M., '76).
G. R. Thompson, B.S.
W. J. Thompson, B.S.

D. J. Tompkins, Ph.B.
V. S. Walsh, B.S.
F. P. Wheeler, B.S.
J. G. Worthington, A.B.

Graduated in 1876.

J. M. Ashley, B.S.
C. P. Aylen, B.C.E.
C. Barclay, B.S.
C. P. de Barros, B.C.E.
W. J. Berry, A.B.
G. Boardman, B.M.E.
C. T. Brewer, Ph.B.
J. T. Brown, B.M.E.
F. de A. V. Bueno, B.C.E.
J. K. Cady, Arch.B.
C. F. Carpenter, B.M.E.
E. F. Church, B.M.E.
M. R. Conable, B.C.E.
C. B. Coon, B.S.
S. H. Coon, A.B.
E. L. Crandall, B.S.
S. S. Eddy, B.S.
*A. F. Eidlitz, B.C.E.
C. H. Esty, A.B.
W. F. Farmer, B.C.E.
D. F. Flannery, B.S.
E. Frayer, A.B., (A.M., '77).
M. M. Garver, B.S.
H. McC. Hadley, Arch.B.
F. E. Heath, B.S.
A. Z. Kent, B.M.E.
W. H. Kent, B.S., (M.S., '80).
F. Looney, B.S.
A. E. Maltby, B.C.E.
W. G. McDowell, A.B.
J. C. McMullen, B.C.E.
R. L. Moore, B.S.
F. W. Noyes, Ph.B.
L. B. Palmer, B.S.
W. H. Parker, Arch.B.
C. R. Parkhurst, B.S.
J. Parmelee, B.S.
C. W. Raymond, B.C.E.
H. J. Rice, B.S., (M.S., '80).
W. K. Roy, B.S.
H. A. Rueppele, B.S.
H. Russel, A.B., (Arch.B., '77)
C. F. Saunders, Arch.B.
H. B. Seeley, Arch.B.
T. Stanton, A.B., (A.M., '77).
J. H. Stubbs, B.C.E.
J. W. Sturdevant, B.S.
S. P. Sturges, A.B.
W. P. Sturges, B.S.
J. B. Tarleton, Arch.B.
*F. E. Taylor, B.M.E.
H. Terry, B.S.
E. D. Thompson, B.C.E.
H. C. Tilden, B.Lit.
C. A. Van Velzer, B.S.
E. A. Wagner, B.S.
C. E. Washburne, Ph.B.
C. B. Wheelock, B.C.E.
C. H. Willmarth, Agr.B., (M.S., '77).
C. P. Woodruff, B.S.
R. Yatabe, B.S.
F. O. Young, B.S.

Graduated in 1877.

W. C. Ames, B.C.E.
J. Aylen, B.C.E.
A. F. Balch, Arch.B.
C. M. Bean, Agr.B.
J. B. Beatty, B.S.
W. E. Bramhall, B.C.E.
Ida Bruce, A.B.
A. S. Carman, B.S.
P. D. Clark, Ph.B.
C. S. Cobb, B.S.
C. M. Cooper, B.S.
J. S. Coon, B.M.E.
F. D. Crim, B.S.
W. L. Deming, Arch.B.
W. E. Dennis, B.S.
W. R. Dobbyn, Lit.B.
L. Eidlitz, B.M.E.
H. W. Foster, A.B.
A. E. Frota, B.C.E.
S. H. Gage, B.S.
W. Gentleman, B.S.
W. S. Gifford, B.S.
G. W. Gillett, Ph.B.
B. H. Grove, A.B.
M. E. Haviland, B.S.
F. B. Hine, B.S.
L. O. Howard, B.S.
D. W. King, Arch.B.
W. E. Lape, B.M.E.
A. J. Loos, B.S.
W. E. Lucas, Ph.B.
D. J. Macpherson, B.C.E.
C. B. Mandeville, B.S.
L. M. Mann, B.C.E.
A. B. McNairy, B.M.E.
T. L. Mead, B.C.E.
J. S. Milford, B.S.
D. C. Moraes, B.C.E.
C. T. Mould, Arch.B.
I. H. Myers, B.S.
E. O'Niel, Ph.B.
J. N. Ostrom, B.C.E.
F. Outerbridge, B.M.E.
E. H. Palmer, B.S.
F. Patrick, Ph.B.
T. B. Peck, Arch.B.
F. M. Pennock, Agr.B.
F. V. D. Sanford, B.S.
E. J. Sellew, A.B.
E. D. Sherman, B.S.
W. J. Sherman, B.C.E.
M. J. Sinton, B.S.
E. R. Smith, B.C.E.
S. M'K. Smith, Ph.B.
J. C. H. Stevenson, Ph.B.
H. Thomas, B.C.E.
M. C. Thomas, A.B.
W. B. Throop, B.C.E.
A. S. Tibbets, B.C.E.
H. H. Tyndale, B.S.
E. M. Van Dusen, Lit.B.
D. F. Van Vleet, B.S.
J. Viegas-Munis, B.C.E.
A. L. K. Volkmann, Arch.B., (A.B. '80).
L. E. Ware, B.M.E.
J. S. Waterman, B.M.E.
F. P. Weeks, B.S.
H. S. White, B.S.
C. F. Wilson, Ph.B.

Graduated in 1878.

C. W. Ames, Lit.B.
J. W. Babcock, A.B.
E. Baker, B.S.
F. Baker, B.S.
A. H. Ballard, B.S.
S. T. Ballard, B.S.
P. Barnard, B.S.
W. Beahan, B.C.E.
A. E. Beardsley, B.S.
F. E. Bissell, B.C.E., (C.E.,'79).
J. M. Borden, B.M.E.
F. Bruen, B.C.E.
E. Burdsall, B.M.E.
D. W. Cady, A.B.
E. Carey, B.S.
H. Conant, B.S.
C. Crandall, B.S.
S. G. Dewsnap, B.S.
B. B. DeWitt, A.B.
J. Dyson, B.C.E.
G. P. Eaton, B.S.
C. B. Everson, B.S.
A. Falkenau, B.C.E.
L. J. Giddings, B.S.
E. Green, Arch.B.
F. A. Halsey, B.M.E.
E. Hayes, B.C.E.
F. Heermans, B.M.E.
M. Hicks, A.B., (Arch.B., '80).
J. T. Hill, B.M.E.
G. M. Jarvis, B.C.E.
B. Johnson, B.M.E.
L. F. Jones, B.S.
W. Keith, B.S.
F. M. Kendall, B.S.
J. S. Lehmaier, Ph.B.
F. W. Mann, B.S.
C. D. Marx, B.C.E.
F. A. Maxwell, B.C.E., (C.E., '79).
C. H. McCormick, B.C.E.
K. McEbright, A.B.
W. L. McBay, A.B.
F. O. Meeker, B.S.
T. D. Merrill, B.C.E.
J. Ness, B.S.
M. E. Oliver, Ph.B.
W. B. Pattin, B.S.
W. P. Pickett, B.S.
B. de A. Prado, Agr.B.
E. L. Preston, B.C.E.
R. Putnam, Lit.B.
A. M. Reeves, B.S.
C. M. Rexford, A.B.
Q. N. Ribiero, Arch.B.
F. V. Rodriguez, B.C.E.
W. K. Seaman, B.M.E.
E. H. Sellers, A.B.
A. W. Smith, B.M.E.
C. S. Thacher, B.C.E.
R. H. Treman, B.M.E.
H. J. Van Norman, B.S.
A. C. de Vasconcellos, B.M.E.
A. C. Wakeley, Lit.B.
W. Weed, B.S.
P. A. Welker, B.C.E.
W. J. Wilcox, B.M.E.

Graduated in 1879.

W. M. Alberti, B.S.
C. N. Blowers, B.S.
E. W. Bradford, B.S.
A. Buchman, Arch.B.

A. Cane, A.B.
W. Chandler, B.S.
M. F. Conde, Lit.B.
G. A. Dounce, A.B.
W. S. Edwards, B.S.
A. M. Farrington, B.V.S.
N. E. Ferguson, B.C.E.
A. Fleischman, Arch.B.
S. J. Gibson, B.S.
H. Gifford, B.S.
H. L. Green, B.S.
J. A. Haight, A.B.
E. E. Haskell, B.C.E.
A. S. Hathaway, B.S.
R. Herman, B.C.E.
L. L. Hill, B.S.
V. N. Hostetler, B.S.
E. C. Howland, Lit.B.
W. A. Ingalls, B.S.
C. C. Jackson, B.S.
J. C. Kennedy, B.C.E.
R. S. Kent, B.S.
W. C. Kerr, B.M.E.
N. Kozima, Arch.B.
John Lewis, B.M.E.
C. O. Lucas, B.S.
E. B. Macy, B.S.
E. Magner, B.S.
H. Marx, B.M.E.
C. V. Mersereau, B.C.E.
A. Millard, B.S.
H. M. Mills, Lit.B.
E. J. Moffat, Lit.B.
D. E. Morris, A.B.
E. R. Morse, B.S.
W. Newton, B.S.
W. Olney, B.C.E.
R. A. Parke, B.M.E., (C.E.,'79).
E. M. Patten, Lit.B.
W. B. Philipp, B.S.
M. M. Pitcher, A.B.
L. H. Porter, B.S.
E. C. Russel, A.B.
S. J. Russel, Lit.B.
C. Ryder, B.S.
F. H. Severance, B.S.
S. A. Simons, A.B.
G. F. Simpson, B.C.E.
F. W. Skinner, B.C.E.
F. E. Smith, B.S.
W. J. Smith, B.C.E.
M. J. Spaulding, B.S.
J. P. Tibiriça, B.M.E.
C. Tomkins, B.S.
J. W. Warner, B.S.
A. Washburn, B.S.
A. Weed, B.C.E.
M. E. Weed, Lit.B.
J. H. Weinmann, B.S
G. M. Welles, B.S.
J. A. Woodward, B.S.
F. A. Wright, Arch.B.
J. H. W. Young, B.S.

Graduated in 1880.

C. R. Allison, B.S.
C. E. Atwood, B.S.
W. A. Baker, B.S.
J. D. Beckwith, B.S.
E. C. Bissell, B.S.
W. B. Breed, B.S.
W. Bronk, A.B.
H. A. Buck, B.S.
C. R. Carpenter, B.S.
G. D. Clements, B.S.

H. A. Cramphin, B.S.
F. S. Curtis, B. S.
E. W. Curtiss, B.M.E.
A. L. Ewing, B.S.
W. A. Finch, A.B.
F. E. Fischel, Lit.B.
G. F. Gifford, B.S.
D. W. Goodwin, B.S.
R. P. Green, B.C.E.
J. A. Hamilton, B.S.
R. W. Havens, B.C.E.
R. P. Hayes, B.S.
W. A. Henry, Agr.B.
C. Humphrey, B.S.
W. A. Huntley, Lit.B.
F. Irvine, B.S.
C. H. Johnson, A.B.
A. Jonas, B.S.
I. W. Kelley, Arch.B.
W. D. Kelley, B.S.
E. A. Landon, B.C.E.
J. T. Leary, B.S.
C. S. Leeds, B.S.
F. L. Lovelace, Ph.B.
C. E. Manierre, B.S.
G. M. Mann, Agr.B.
A. D. Merry, B.S.
D. M. Mesick, B.C.E.
H. J. Messenger, Lit.B.
J. S. Monroe, B.S.
H. M. Norton, Agr.B.
J. E. Norton, B.S.
G. F. Otis, B.M.E.
J. Page, B.C.E.
S. S. Phelps, Ph.B.
C. E. Pierce, B.S.
H. Pierce, B.C.E.
M. E. Poole, A.B.
M. E. Roberts, Ph.B.
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L. B. Shackford, Lit.B.
E. H. Sibley, A.B.
C. D. Smith, A.B.
F. W Smith, A.B.
R. S. Smith, A.B.
R. L. Stanton, B.S.
W. Starr, A.B.
E. B. Terry, B.S.
F. S. Thomas, B.S.
J. S. Tidball, B.S.
F. G. Tiffany, B.S.
J. N. Tilton, Arch.B.
A. M. Tracy, B.S.
W. Trelease, B.S.
S. B. Turner, Lit.B.
R. R. Upjohn, B.C.E.
A. T. Vail, B.S.
L. J. Vance, B.S.
C. G. Wagner, B.S.
H. Webster, B.S.
F. C. Whitney, A.B.
F. J. Whiton, A.B.
J. M. Wilson, Ph.B.
A. J. Wing, B.S.

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ALPHABETICAL LIST OF STUDENTS.

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Adams, J. D. 35 E. Mill
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Aiken G. D. 127 E. Buffalo
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Ainslie J. S. 13 Sears
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Aldrich H. L. Heustis st
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Allen J. G. Cascadilla Cottage
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Alling A. A. Titus Block
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Avery C. I. Finch Block
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Chapman E. L. Gregg Block
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Chester F. D. 12 Lake Ave
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Ehrman H	Soph.	Titus Block
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Kelley W. D. Cascadilla Cottage
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Kenney E. C. 60 N. Tioga
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Kent W. A. 51 Heustis
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Kerr M. R. 30 University st
Soph.
Kilbourn F. L. University Hill
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Knap W. H. Titus Block
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Knowles W. N. 39 Heustis
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Kraus W. C. Cor Buffalo & Eddy
Fr.
Krüsi H. Cascadilla Cottage
Junior.

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Larned W. H. 75 Dryden Road
Fr.
Law J. E Prof. Law's
Fr.
Leary F. 63 N. Albany
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Lillis T. F. 15 S. University
Soph.
Linn W. W. Titus Block
Fr.
Longwell H. E. 129 E. Seneca
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Marshall H. 127 E. Buffalo
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Matthews A. F. 43 N. University
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McClelland R. W. 127 E. Buffalo
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McCrea C. W. 35 Mitchell
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Cor. Factory and Buffalo
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McLennan R. Aurora St House
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Nash H. 123 N. Tioga
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Oakes H. M. Sage
Fr.
Oatley E. L. 239 E. State
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Fr.
Ormsby F. W. Factory st
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Ostrander W. S. D.K.E. House
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Senior.
Overton F. C. 110 E. Seneca
Fr.

Page W. H. Forest Home
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Palmer M. C. 142 E. Buffalo
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Soph.
Payne L. T. 83 Seneca
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Pearson E. 40 Eddy st
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Pease H. H. Eddy st
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Potter C. A. 126 E. Seneca
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Poucher W. A. P. Wall's
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Preswick E. H. Forest Home
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Prosser C. S. 67 N. Aurora
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Putnam M. C. Sage
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Rackemann F. 33 Quarry
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Randolph C. 8 Sprague Block
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Rappeleye W. G. Cornell Avenue
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Rhodes F. 110 E. Seneca
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Robinson C. I. Cor. Buff. & Eddy
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Runyon F. W. 116 E. State
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Wyckoff J. N. 130 E. Buffalo
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Yost F. L. 22 S. Geneva
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RULES

FOR THE

GUIDANCE OF STUDENTS,

CORNELL UNIVERSITY,

SEPTEMBER, 1880.

---

§ 1. At the beginning of every term each student must obtain a Certificate of Registration before joining any class or attending any lectures; and no student, after having once been admitted to the University, will be allowed to register after the close of REGISTRATION DAY, except by special permission of the Faculty, granted on the presentation of a satisfactory excuse for his delay.

§ 2. Students in the regular courses must take, each term, the number of hours required of them in their course for the term, unless excused by the Faculty: and Optional students, unless otherwise allowed by the Faculty, must attend not less than fifteen recitations per week, or their equivalent in other University exercises, in addition to Military Drill or its substitute.

§ 3. Optional students must, on their application for their Registration Ticket, furnish the Registrar with a list of the studies they intend to take for the term. And no student will be allowed to join any class, unless he enters his name with the Professor in charge of it immediately after his registration.

§ 4. No student registering for an optional study will be allowed to drop it during the term; and if it be a study that is continuous through the year, he will be required to pursue it or the year unless excused by the Faculty.

§ 5. All the courses leading to a degree require four years or their completion; and no student will be allowed to graduate without having passed the entire four years, or twelve terms, in the University, except,

1. Any student who may have had in an other college, or elsewhere, an equivalent of one or more of the years of any one of our courses, may take studies belonging to an advanced standing, in that course, on his admission to the University; but he must pass the examination required for that standing at the first opportunity after his admission.

2. Any student who, after having been admitted to the University, shall be absent on leave, for sickness or other sufficient cause, may be allowed to make up the studies of the period of his absence by taking extra work when he returns, or by passing up in any work done elsewhere during his absence at the first opportunity after his return.

§ 6. Any student, who, in order to make up deficiencies caused by sickness or unavoidable absence from the University, shall have occasion to take more than the regular studies of his course for any term, should apply to the Faculty for permission to do so, at the beginning of the term; and no student will be entitled to any credit for extra studies pursued without such permission.

§ 7. Instruction in Military Science and Drill, or a substitute therefor, is required of all students during the first and third terms of the first and second years, and during the second term of the fourth year in the University.

§ 8. Students, who enter on advanced standing, will be

allowed to take a substitute for the Drill during their second year; and all students are allowed to take a substitute for the Military Science required in the second term of the fourth year.

(1) The substitute must be equal to two recitations per week, and examinations must be passed in what is thus taken, as in any other University work.

(2) It may not be anything in which the student offering it has previously failed to pass his examination, or in which he is at the time conditioned; nor, (in case he is in any one of the regular courses) anything that is required in his course for the term in which it is offered as a substitute.

(3) It must be (1) some science, (either recitations, lectures or laboratory work,) (2) some foreign language, or (3) (for those students who are in courses requiring such work,) it may be extra draughting or shop work.

(4) The substitute that is offered must be specified to the Registrar at the time of registration. But if no substitute is thus offered and accepted, the student will be holden to the Drill or Military Science for the term, whatever may be the number of hours of University work he may have.

(5) No change in the work thus accepted as a substitute for the Drill or Military Science may be made during any term unless it is made, and the registration modified accordingly within one week after obtaining the registration ticket.

(6) Foreigners not naturalized, and students who labor and are obliged to depend upon their labor for means of support, are excused from both Drill and the substitute therefor, on making these facts known to the Military Committee. Students will also be excused for physical disability on the recommendation of the Committee and the approval of the Faculty.

§ 9. All students that drill are required to procure the uniform prescribed by the University and to wear it on all occasions of drill or parade. But the Military Committee have power to excuse students from the application of this rule, on satisfactory proof being furnished that they are unable to procure the uniform.

Students who are excused from wearing the uniform may be required to wear, when at drill or on parade a black hat or cap, and coat and pants which are either black or of a color so dark as not to be easily distinguished from black.

§ 10. If any student who is excused from Drill or its substitute, either as a laboring student or on account of physical disability, shall take more than fifteen hours of recitations per week or the number required in his course, his excuse will be considered as anulled.

§ 11. Tuition must be paid at the beginning of each term; and if any student fails to pay his dues to the University or to make a satisfactory arrangement in regard to them, within ten days after obtaining his Registration Ticket, his name will, on the report of the Treasurer to the Faculty, be struck from the rolls of his classes.

§ 12. Students who are conditioned on their entrance examinations will be required to make up their condition at such time, *before the close of the third term of the year*, as the Professor in charge of the department may require: and no student will be allowed to register for the first term of his second year whose conditions at his entrance examinations shall not have been removed.

§ 13. No student who fails to pass his examinations at the close of any term so as to get the standard required for graduation, will be allowed to take more than fifteen hours of recitations and lectures for the following term, except those that are accepted as a substitute for Drill or Military Science.

§ 14. Every student who shall be conditioned at any examination must remove the condition, either by passing at such examination of conditioned students as may be appointed for the first week of the next academic year after the failure, or by passing an examination in class the next time after such failure that any class shall be examined in the study in which he is conditioned.

(1) If the student fail to remove the condition at one of the examinations above specified, he will not be admitted to any subsequent examination in that study unless he shall have taken it over again in class.

(2) No student who is dropped from any one of his classes for a failure at his examinations, will be allowed to enter an examination again in that subject until he shall have taken it over again in the class, except by permission of the Faculty for satisfactory reasons.

§ 15. Any Professor in charge of a department may exclude from his classes any student who either has not taken, or has failed to pass in, any study that is required for the successful prosecution of the studies of the class which the student proposed to enter.

§ 16. No optional student will be allowed to register for or pursue any two subjects that come at the same hour so as to conflict with each other.

§ 17. No student who has not regularly attended the lectures, recitations, etc., in any subject will be allowed to enter the examination in that subject except either (1) to make up a condition, or (2) to pass an examination in some subject that he has pursued elsewhere: and in this latter case the examinations must be passed in accordance with the provisions of these Rules, § 5, 1 and 2.

§ 18. Any student in any regular course having a study be-

longing to a previous year to make up, will be required to attend the instruction in the study belonging to the year for which he registered at the beginning of the term; and in case of any conflict of hours at the time of examination, each student must attend the examination in the study of the year for which he registered, in preference to any other.

§ 19. Any student having occasion to be absent from his University duties must obtain permission from the President or Vice-President, or, in case the absence is to extend over the term examinations, it must be granted by the Faculty.

§ 20. All students are expected to be regular in their attendance, and be present at all the exercises of the classes they may join, unless they have a satisfactory excuse for their absences or the neglect of their duties; and if any student shall absent himself from *all of his* University duties for more than three consecutive days without leave, he may be regarded as having withdrawn from the University.

§ 21. No student will receive leave of absence other than temporary, or dismissal from the University, unless all dues shall have been paid, and his standing at the time be such as to allow him to continue with his classes.

§ 22. Any student obtaining leave of absence for the purpose of going out of town, must leave town within twenty-four hours after having obtained his leave to do so, or it will be considered as annulled.

§ 23. A student whose term examinations show that his average proficiency is not satisfactory, will be considered as having thereby dropped from his classes, and will not be permitted to register again except for special reasons, until the following year, at the beginning of the term corresponding to that in which the failure occurred

§ 24. If, after this, he fails again to pass his examinations,

he will be readmitted only by vote of the Faculty, and on condition that he confine himself strictly to some one of the regular courses, repeating all the studies in the course selected, in which he has not passed satisfactory examinations. By failure to comply with these conditions the student forfeits his privilege of readmission.

§ 25. Any student who has fallen from his classes, or who for any reason has ceased to attend to his University duties, or whose parents have been requested to remove him, must, under penalty of expulsion, unless a resident of Ithaca, leave town within five days after notice of his having fallen out shall have been given him.

§ 26. If a student is detected in any fraud in examination, the examination will be regarded as void, and the offender will be suspended from the University.

§ 27. Students found guilty of intoxication, gambling or other gross immorality, or of hazing in any form, will be removed from the University.

§ 28. No student is permitted, except for purposes of military drill, to use fire arms in the University buildings, or on the University grounds within half a mile of the buildings.

§ 29. Announcements by the Faculty to the students in general will be considered as duly promulgated after having been posted on the bulletin board, and notices to students which shall be deposited in the post-office, will after twenty-four hours, be considered as delivered.

§ 30. All communications from students intended for the Faculty shouid be deposited in the Letter-Box placed on the door at the entrance to the Faculty Room for that purpose before two o'clock on Friday of each week.

THE CORNELL UNIVERSITY.

WINTER TERM, 1880–81.

CALENDAR.

TUESDAY, January 4,	Entrance Examinations.
WEDNESDAY, January 5,	Entrance Examinations contin'd.
THURSDAY, January 6,	REGISTRATION for the Term.
FRIDAY, January 7,	Instruction begins.
TUESDAY, January 11,	FOUNDER'S DAY.
TUESDAY, February 22,	WASHINGTON'S BIRTHDAY.
FRIDAY, March 4,	WOODFORD PRIZE COMPETITION.
MONDAY, March 21,	Term Examinations begin.
FRIDAY, March 25,	Term ends.

SPRING TERM.

SATURDAY, April 2,	REGISTRATION for the Term.
MONDAY, April 4,	Instruction begins.

OFFICE HOURS.

VICE-PRESIDENT, Daily 12–1.
TREASURER, Daily 9 a. m. to 3 p. m.
REGISTRAR, Daily 12 a. m. to 1 p. m.; Fridays, 2.30 to 4 p. m.
LIBRARIAN, Daily 2 to 5 p. m.
LIBRARY and Reading Room, Open daily 8 a. m. to 5 p. m.

FACULTY MEETINGS, Friday of each week 4 p. m.

Janitor, J. A. HOLMES, 54 N. University.

STUDENTS' DIRECTORY.

SOUTH UNIVERSITY BUILDING:

South Hall.—Offices of the Vice-President, the Treasurer, and the Registrar. Physical Laboratory up stairs, 23, 25 and 26. Office of Military Professor, 24. Armory, 27. Recitation-room, 28.

Middle Hall.—Faculty-room, Agricultural Museum, and Lecture-rooms E, F, G, H, I and K.

North Hall.—Ladies' Room (No. 3), Recitation-rooms 1, 2, 4, 5 and 7.

McGRAW BUILDING:

South Entrance.—The Library: the Physical Lecture-room. The Geological Laboratory up stairs.

Middle Entrance.—The Museums of Paleontology, Geology, Mineralogy, Ornithology, Conchology, and Comparative Zoölogy. Entomological Laboratory.

North Entrance.—The Architectural Rooms, and the Anatomical Lecture-room.

NORTH UNIVERSITY BUILDING:

South Hall.—Recitation-rooms 49, 51, and 52.

Middle Hall.—Societies' Room (M,) Lecture-rooms N, O, P, Q, R, S and T.

North Hall.—Recitation-rooms 33, 34, 35 and 36.

SIBLEY COLLEGE:

Printing Office, Mechanical Laboratory and Mechanical Lecture-rooms. Draughting-rooms for Free hand and Mechanical Draughting.

CHEMICAL BUILDING:

North Wing.—Rooms of the Department of Civil Engineering.

South Wing.—Chemical and Mineralogical Laboratories, and Lecture-rooms for General and for Agricultural Chemistry.

Southeast Corner.—Lecture-room and Museum of Veterinary Science.

SAGE COLLEGE:

Southwest Entrance.—Botanical Lecture-rooms, Museums and Laboratories.

INDEX OF INSTRUCTORS.

PRESIDENT ANDREW D. WHITE, LL.D., Absent in Europe.

ANTHONY, Professor William A., (I) *Electricity and Magnetism*, M. W. F., 12. (II) *Laboratory Practice*, Daily, 8–5.

BABCOCK, Professor Charles, (I) *Lectures on Byzantine and Romanesque Architecture*, Daily, 9. (II) *Lectures on Modern Architecture*, M. W. F., 11. (III) *Architectural Mechanics*, T. Th., 11. (IV) *Designing*, Daily, 8–1.

BARNARD, Assistant Professor W. S., (I) *Zoology of Invertecrates*, M. W. E., 12, (latter part of the term). (II) *Entomological Labortory*, Daily 8-5.

BRENEMAN, Professor A. A., (I) *Chemical Philosophy*, M. W. F., 10. (II) *Chemical Laboratory Practice*, Daily, 8–5.

BURBANK, Professor James B., *Military Science*, W. F., 12.

CALDWELL, Professor George C., (I) *Agricultural Chemistry*, Daily, 9. (II) *Advanced Organic Chemistry*, twice a week. (III) *Chemical Laboratory Practice*, Daily, 8–5.

CHURCH, Assistant Professor Irving P., (I) *Hydraulics*, Daily, 9. (II) *Mechanics*, T. Th., 8, M. W. F., 10. (III) *Tinting and Shading*, Daily, 11.

CLEAVES, Assistant Professor Edwin C., *Free-hand Drawing*, Daily, 10–4.

CLINTON, Foreman M. L., *Shop Practice*, Daily, 7–6.

COMSTOCK, Assistant Professor J. Henry. [In Washington].

CORSON, Professor Hiram, (I) *Anglo-Saxon*, Daily, 11. (II) *English Literature*, M. W., 10. (III) *Special Classes* (Sophomores), M. W. F., 12, (Seniors), T. Th., 12.

CRANDALL, Assistant Professor Charles L., (I) *Right-line Drawing*, Daily, 9. (II) *Pen Topography*, Daily, 10. (III) *Geodesy*, M. W. F., 8, T. Th., 12.

CRANE, Professor T. Fred, (I) *French* (Corneille, *Cinna*), M. W. F., 8, 9. (II) *Italian*, T. Th., 8. (III) *Spanish*, T. Th., 9.

DUDLEY, Assistant Professor William R., (I) *Vegetable Histology*, T. Th., 10. (II) *Laboratory Work*, Daily, 8–5.

FISKE, Professor Willard. [Absent in Europe].

FLAGG, Professor Isaac, *Greek*, (I) Æschylus and Euripides, M. T. Th. F., 9. (II) Homer, M. T. Th., 10. (III) *Greek Composition*, F., 10.

FUERTES, Professor Estévan A., (I) *Structural Details*, T. Th., 9–11. (II) *Stone Cutting*, M. W. F., 10–1. (III) *Engineering Laboratory Work*, Daily, 9–4.

GAGE, Instructor Simon H., *Practical Physiology, Laboratory Work*, Daily, 8–5.

GARVER, Instructor Madison M., *Mineralogical Laboratory*, . aily, 8–5.

HALE, Professor William G., (I) *Latin* (Pliny's Letters), M. T. W. Th., 8. (II) (Cicero pro Roscio Amerino, Horace Satires), M. T. W. Th., 9.

HEWETT, Assistant Professor Waterman T., (I) *German* (Goethe's Prosa,) M. W. F., 10, 11. (II) (Geschichte des Deutschen Volkes), T. Th., 9. (III) *Middle High German* (Lyric Poetry), T. Th., 11.

JONES, Assistant Professor George W., (I) *Algebra*, Daily, 8, 10. (II) *Calculus*, Daily, 9.

KENT, Instructor W. H., *Chemical Laboratory Practice*, Daily, 8–5.

KERR, Assistant Professor Walter C., (I) *Steam Engine* Daily, 9. (II) *Machine Construstion*, Daily 10–1.

LAW, Professor James, *Veterinary Anatomy and Medicine*, Daily, 8.

LAZENBY, Assistant Professor William R., (I) *Vegetable Gardening*, T. Th., 10. (II) *Commercial Seed Growing*, T. Th., 10 (last part of term). (III) *Laboratory Work and Experiments*, W., p. m. 2.30.

LUCAS, Instructor William E., (I) *Rhetoric and Composition*, T. Th., 9, 10, 11. (II) Monday, 9, Wednesday, 10, Friday, 12.

MACKOON, Professor Bela P., *German*, Daily, 8, 9, 10.

MOLER, Assistant Professor George S., *Physics, Laboratory Practice*, Daily, 8–5..

MORRIS, Professor John L., (I) *Machine Construction*, Daily, 8–1. (II) *Lectures and Designing Machines*, Daily, 10–1.

OLIVER, Professor James Edward, (I) *Astronomy*, M. W. F., 9. (II) *Special Mathematics*, Daily, 10. (III) *Special Mathematics*, Daily, 11.

OSBORNE, Instructor C. Francis, *Architectural Drafting*, Daily, 8–5.

PERKINS, Assistant Professor William R., (I) *Greek*, (Euripides and Æschylus), M. T. Th. F., 9. (II) *Latin*, (Cicero de Amicitia, Horace's Odes), T. W. Th., 6. (III) *Greek* Lyric Poets, Friday, 11.

POTTER, Assistant Professor Ziba H., (I) *Political Economy*, M. W. T. Th., 10.

PRENTISS, Professor Albert N., (I) *Vegetable Physiology*, M. W., F., 9. (II) *Botanical Laboratory Work*, Daily, 8–5.

ROBERTS, Professor Isaac P., (I) *Agriculture*, Daily, 11. (II) *Farm Work*, Daily, 8–6.

RŒHRIG, Professor Frederick L. O., (I) *French* (Otto's Grammar), Daily, 9, 10. (II) *Arabic*, M. F., 11 (III) *Sanscrit*, T. W. Th., 11.

RUSSEL, Vice-President William C., (I) *Roman History*, Daily, 11. (II) *American History*, M. W. F., 9. (III) *Modern French Literature*, T. Th., 9. Office hours, Daily, 12–1.

SCHAEFFER, Professor Charles A., (I) *General Chemistry*, T. Th., 12. (II) *Mineralogy and Assaying*, Daily, 1–6. (III) *Chemical Laboratory Practice*, Daily, 8–5.

SHACKFORD, Professor Charles C., (I) *Essays and Criticisms*, T. Th., 12. (II) *General Literature and Oratory*, M. W. F., 10. (III) *Extempore Speaking*, W. F., 9. (IV) *Orators*, M., 12. (V) *Shakespeare*, T. Th., 9, 10, 11.

SMITH, Instructor B. Hermon, *Typography* (Printing Office), 8–5.

SMITH, Professor Goldwin, (Non-Resident).
No Lectures this Term.

STEBBINS, Assistant Professor Alfred, *French* (Otto's Grammar), Daily, 9, 10, 11.

WAIT, Professor Lucien A., (I) *Calculus*, Daily, 8. (II) *Solid Geometry* and *Conics*, Daily, 8, 9. (III) *Algebra*, Daily, 9, 10.

WEBB, Professor J. Burkitt. [Absent in Europe].

WHITE, Assistant Professor Horatio S., (I) *German* (Goethe's Prosa) M. W. F., 9, 10. (II) (Goethe's Faust), T. Th., 9. (III) (Speilhagen's Clara Vere), T. Th., 10.

WILDER, Professor Burt G., (I) *Zoology of Vertebrates*, M. W. F., 11, first half of the term. (II) *Comparative Anatomy* (Laboratory Practice), Daily, 8–5.

WILLIAMS, Professor Samuel G., (I) *Economic Geology*, M. W. F., 9. (II) *Laboratory Work*, Daily, 8–5.

WILLIAMS, Assistant Professor Henry S., (I) *Palæontology*, *Laboratory Work*, Daily, 8–5.

WILSON, Professor William D., (I) *Philosophy of History*, M. W. F., 11. (II) *Political Economy*, T. Th., 11. (III) *Hebrew*, M. W. F., 10.

WING, Professor Charles H., (Non-Resident).
No Lectures this Term.

SCHEDULE OF SUBJECTS, HOURS AND ROOMS OF EXERCISES.

Freshman Studies.

SUBJECT.	SECTIONS.	HOURS.	ROOM.	DAYS.	PROFESSOR.
ALGEBRA,	Sec. 1	8.00	36	Daily.	Jones.
"	" 2	9.00	33	"	Wait.
"	" 3	10.00	36	"	Jones.
"	" 4	10.00	33	"	Wait.
FRENCH,	Sec. 1	9.00	P	Daily.	Stebbins.
"	" 2	10.00	P	"	"
"	" 3	11.00	P	"	"
"	" 4	9.00	O	"	Rœhrig.
GERMAN,	Sec. 1	8.00	E	Daily.	MacKoon.
"	" 2	9.00	E	"	"
"	" 3	10.00	E	"	"

Rhetoric and Comp.,	Sec. 1	9.00	S	T. Th.	Lucas.
"	" 2	10.00	"	"	"
"	" 3	11.00	"	"	"
Anglo-Saxon,	Class.	11.00	I	Daily.	Corson.
Latin,	Cl., Lit. and Phil.	9.00	28	M. T. W. Th.	Perkins.
Greek,	Classical.	10.00	1	M. T. Th. F.	Flagg.
Shop Practice,	Mechanic Arts.	8—6	2 Sibley.	Daily.	Clinton.
Right-Line Drawing,	Eng. and Math.	9.00	Eng. R. 4	Daily.	Crandall.
Free Hand Drawing,	Class.	10—4	5 Sibley.	Daily.	Cleaves.
Zoology,	Phil and Science.	11.00	Anat. L. R.	M. W. F.	Wilder and Barnard.
Proj. and Tinting,	Architecture.	8—5	Arch. D. R.	Daily.	Osborne.

Sophomore Studies.

SUBJECT.	SECTIONS.	HOURS.	ROOM.	DAYS.	PROFESSOR.
GERMAN (*Advanced*),	Sec. 1	9.00	5	M. W. F.	White.
"	" 2	10.00	5	"	"
"	" 3	10.00	F	"	Hewett.
"	" 4	11.00	F	"	"
FRENCH (*Advanced*),	Sec. 1	8.00	51	M. W. F.	Crane.
"	" 2	9.00	51	"	"
CHEMISTRY,	Class.	12.00	Ch. L. R.	T. Th.	Schaeffer.
PHYSICS, *El. and Mag.*,	Tech., Spec. & Phil.	12.00	Phys. L. R.	M. W. F.	Anthony.
ZOOLOGY,	Class.	11.00	Anat. L. R.	M. W. F.	Wilder and Barnard.
CALCULUS,	Eng., Mech. Arts.	8.00	33	Daily.	Wait.
"	Arch., Ph. & Sc.	9.00	36	"	Jones.
ELOCUTION & COMP.,	Sec. 1	9.00	S	Monday.	Shackford
"	" 2	10.00	"	Wednesday.	and
"	" 3	12.00	"	Friday.	Lucas.

LATIN,	Classical and Lit.	9.00	7	M. T. W. Th.	Hale.
GREEK,	Classical.	10.00	28	M. T. Th. F.	Perkins.
EARLY ENGLISH,	Literature.	12.00	1	M. W. F.	Corson.
AGR. CHEMISTRY,	Agriculture.	9.00	Chem. B. 3	Daily.	Caldwell.
CHEMICAL PRACTICE,	Chem. and Physics.	8—5	Chem. Lab.	Daily.	Caldwell and Kent.
ARCH. *Draughting*,	Architecture.	8—5	Arch. D. R.	Daily.	Osborne.
PEN TOPOGRAPHY,	Engineering.	10.00	Eng. R. 4	Daily.	Crandall.
TINTING & SHADING,	"	11.00	Eng. R. 4	Daily.	Church.
SHOP PRACTICE,	Mech. Arts.	8—6	Mech. Lab.	Daily.	Clinton.
ZOOLOGY, *Lab. Work*.	Natural History.	8—5	Ant. Lab.	Daily.	Wilder & Gage.
INVERTEBRATE, *Practice*,	—	—	Zool. L. H.	—	Barnard.

Junior Studies.

SUBJECT.	SECTIONS.	HOURS.	ROOM.	DAYS.	PROFESSOR.
ROMAN HISTORY,	Class.	11.00	T	Daily.	Russel.
POLITICAL ECONOMY,	Section 1	9.00	35	M. W.	Potter.
"	" 2	9.00	"	T. Th.	"
"	" 3	10.00	"	"	"
PHYSICS, *El. and Mag.*,	Class.	12.00	Phys. L. R.	M. W. F.	Anthony.
ASTRONOMY,	Class.	9.00	34	M. W. F.	Oliver.
ESSAYS & ORATIONS,	Section 1.	12.00	T	Tuesday.	Shackford.
	" 2.	12.00	"	Thursday.	"
ENG. LITERATURE,	Class.	10.00	K	M. W.	Corson.
VETERINARY SCIENCE,	Agr. and Nat. Hist.	8.00	Vet. L. R.	Daily.	Law.
VEG. GARDENING, ETC.,	Agriculture.	10.00	Bot. L. R.	T. Th.	Lazenby.
ARCHITECTURE,	Architecture.	9.00	Arch. L. R.	Daily.	Babcock.
Designing,	"	8—5	Arch. D. R.	"	Osborn.
MECHANICS,	Architecture.	11.00	Arch. L. R.	T. Th.	Babcock.
ECONOMIC GEOLOGY,	Arch., Eng. and Nat.,	9.00	Anat. L. R.	M. W. F.	S. G. Williams.
Lab. Work,	"	8—5	Geog. Lab.	Daily.	"

Chem. Philosophy,	Chem. and Physics.	10.00	Chem. B. 3	M. W. F.	Breneman.
Chemical Practice,	Chem. and Physics.	8—5	Chem. Lab.	Daily.	Caldwell and Breneman.
Mineralogy,	Arch. Chem. & Eng.	1—5	Min. Lab.	Daily.	Schaeffer.
Metal'gy & Assaying,	Chem. and Eng.	1–6	1 Chem. B.	Daily.	Schaeffer.
Mechanics,	Eng. and Mech. Arts.	8.00	Eng. 2	T. Th.	Church.
"	"	10.00	"	M. W. F.	"
Struct. Details,	Engineering.	9—11	Eng. 3	T. Th.	Fuertes.
Sp. Mathematics,	Mathematics.	10.00	34	Daily.	Oliver.
Mach. Construction	Mechanic Arts.	8—5	4 Sibley.	Daily.	Morris.
Shop Practice,	Mech. Arts.	8—6	Mech. Lab.	Daily.	Clinton.
Veg. Histology,	Nat. Hist. & Agr.	9.00	Bot. L. R.	T. Th.	Dudley.
Veg. Physiology,	"	"	"	M. W. F.	Prentiss.
Botany, *Lab. Practice*,	"	8—5	Bot. Lab.	Daily.	Prentiss & Dudley.
Palæntology, *Lab. W.*,	Natural History.	8—5	Geol. Lab.	Daily.	H.S. Williams.

Senior Studies.

SUBJECT.	SECTIONS.	HOURS.	ROOM.	DAYS.	PROFESSOR.
American History,	Sections 1, 2 and 3.	9.00	50	M. W. and F.	Russel.
Philosophy of Hist.,	Class.	11.00	K	M. W. F.	Wilson.
Political Economy,	Class.	11.00	K	T. Th.	Wilson.
Gen. Lit. & Oratory,	Class.	10.00	T	M. W. F.	Shackford.
Special Literature,	Literature.	12.00	I	T. Th.	Corson.
Agriculture,	Agriculture.	11.00	4	Daily.	Roberts.
Farm Work,	"	8—6	—	"	"
Veg. Physiology,	Agr. and Nat. Hist.	9.00	Bot. L. R.	M. W. F.	Prentiss.
Veg. Histology,	Agr. and Nat. Hist.	9.00	Bot. L. R.	T. Th.	Dudley.
Bot. Lab. Work,	Agr. and Nat. Hist.	8—5	Bot. Lab.	Daily.	Prentiss & Dudley.

ARCHITECTURE,	Architecture.	11.00	Arch. L. R.	M. W. F.	Babcock.
DESIGNING,	"	8—1	"	Daily.	Osborn.
CHEMICAL PRACTICE,	Chem. and Physics.	8—5	Chem. Lab.	Daily.	Caldwell, Breneman
METAL'GY & ASSAYING,	Chem. and Eng.	1—6	1 Chem. B.	Daily.	Schaeffer.
PHYSICS, *Lab. Practice*,	Chem. and Physics.	8—5	Phys. Lab.	Daily.	Anthony.
MINERALOGY,	Engineering.	1—5	Min. Lab.	Daily.	Schaeffer.
HYDRAULICS,	Engineering.	9.00	Eng. 2	Daily.	Church.
GEODESY,	Engineering.	8.00	Eng. 1	M. W. F.	Crandall.
"	"	12.00	"	T. Th.	"
STONE-CUTTING,	Arch. and Eng.	10—1	Eng. 1	M. W. F.	Fuertes.
ENG. LAB. WORK,	Engineering.	9—4	Eng. 5	Daily.	Fuertes, Crandall and Church.
SPECIAL MATHEMATICS,	Mathematics.	11.00	34	Daily.	Oliver.
MACHINE DESIGNING,	Mechanic Arts.	10—1	3 Sibley.	Daily.	Morris & Kerr.
STEAM-ENGINE,	Mechanic Arts.	9.00	4 Sibley.	Daily.	Kerr.
SHOP PRACTICE,	Mechanic Arts.	8—6	Mech. Lab.	Daily.	Clinton.
PALEONTOLOGY, *Lab. W.*	Natural History.	8—5	Geol. Lab.	Daily.	H. S. Williams.
MILITARY SCIENCE,	All Seniors.	12.00	K	W. F.	Burbank.

OPTIONAL CLASSES.

Subject.	Hour.	Room.	Days	Professor.
ARABIC,	11.00	O	Monday.	Rœhrig.
FRENCH, Juniors & Sen'rs,	9.00	50	T. Th.	Russel.
GERMAN,				
Faust,	9.00	5	T. Th.	White.
Clara Vere,	10.00	5	T. Th.	White.
Gesch't. Deutsch. Volk.,	9.00	F	T. Th.	Hewett.
M. H. German,	11.00	F	T. Th.	Hewett.
GREEK, Juniors & Seniors,	9.00	1	M. T. Th. F.	Flagg.
Lyric Poets,	11.00	28	Friday.	Perkins.
HEBREW,	10.00	17	M. W. F.	Wilson.
ITALIAN, First Class,	8.00	51	T. Th.	Crane.
LATIN, Juniors & Seniors,	8.00	7	M. T. W. Th.	Hale.
RHETORICAL EXERCISES,				
Shakespeare, 1	9.00	N	T. Th.	Shackford.
" 2	10.00	N	T. Th.	Shackford.
" 3	11.00	N	T. Th.	Shackford.
Orators,	12.00	N	M.	Shackford.
Extempore Speaking,	9.00	N	W. F.	Shackford.
SANSCRIT,	11.00	O	T. Th.	Rœhrig.
SPANISH, beginning,	9.00	51	T. Th.	Crane.
5th YEAR ENGINEERS,				
Special Ast. & Geod.,	9-4	Eng. 3	Daily.	Fuertes,
Technical Reading,	12.00	Eng. 2	Daily.	Church &
Lab. Work,	9-4	Eng. 5	Daily.	Crandall.

TERM EXAMINATIONS.

The Examinations begin on Monday, March 21, 8 a. m., and end on Friday, March 25.

If any student is pursuing studies that belong to different years, he must, in case of any conflict of hours at the time of examination, attend the examination in the study of the year for which he is registered, in preference to any other.

Examination hours extend from 8 to 11 a. m.: from 11 a. m. to 1.30 p. m.; and from 2.30 to 5 p. m.

MONDAY.

8 a. m.	Sen'rs & Jun'rs,	Latin,	I.
—	Juniors,	Analytic Mechanics, (*a*),	6 Sibley.
—	Sophomores,	Zoology,	Anat. L. R.
—	Sophomores,	Greek,	1.
11 a. m.	Seniors,	Agriculture,	4.
—	Seniors,	Gen. Lit. and Oratory,	T.
—	Juniors,	Political Economy,	K.
—	Sophomores,	Agr. Chemistry,	Ch. B. 3.
2½ p.m.	Seniors,	Hydraulics (*a*),	3 Sibley.
—	Seniors,	Architecture,	Arch. L. R.
—	Sens. & Juns.,	Veg. Phys. & Hist.,	Bot. L.R.
—	Freshmen,	French,	T.

TUESDAY.

8 a.m.	Seniors,	Organic Chemistry,	Ch. B. 3.
—	Juns. & Sophs.	Acoustics & Optics,	T.
—	Freshmen,	Greek,	1.
11 a.m.	Seniors,	Philosophy of History,	K.
—	Sens. & Juns.,	Mineralogy,	Ch. L. R.
—	Juniors,	Astronomy,	6 Sibley.
—	Sophomores,	Latin,	T.
2½ p.m.	Seniors,	Hydraulics, (*b*),	3 Sibley.
	Juniors,	German,	I.
—	Juniors,	Architecture Lectures,	Arch. L. R.
—	Freshmen,	Algebra,	T.
—	Optional,	Spanish,	51.

WEDNESDAY.

8 a.m.	Seniors,	Geodesy,	3 Sibley.
—	Seniors,	Special Literature,	I.
—	Sen'rs & Jun'rs,	Greek,	1.
—	Juniors,	Analytical Mechanics (*b*),	6 Sibley.
—	Freshmen,	German,	K.
11 a.m.	Seniors,	Political Economy,	K.
—	Juniors,	Arch. Mechanics,	Arch. L. R.
—	Juniors,	Chem. Philosophy,	Ch. B. 3.
—	Freshmen,	Latin,	T.
2½ p.m.	Seniors,	Steam-engine,	50.
—	Juniors,	History,	T.
—	Sophomores,	Chemistry,	Ch. L. R.
—	Sophomores,	Early English,	I.

THURSDAY.

8 a.m.	Seniors,	Stone-cutting,	6 Sibley.
—	Sophomores,	German,	K.
—	Optional,	Italian,	51.
11 a.m.	Seniors,	Militaay Science,	6 Sibley.
—	Juniors,	Economic Geology,	3 Sibley.
—	Freshmen,	Rhetoric,	T.
2½ p. m.	Seniors,	German,	E.
—	Juniors,	Veg. Gardening, etc.,	Bot. L. R.
—	Sophomores,	French,	T.
—	Freshmen,	Anglo-Saxon,	I.

FRIDAY.

8 a.m.	Juniors,	English Literature,	K.
—	Juniors,	Veterinary Science,	3 Sibley.
—	Sophomores,	Calculus,	6 Sibley.
9 a.m.	Optional,	Arabic,	O.
11 a.m.	"	Sanskrit,	O.

THE

CORNELL UNIVERSITY

REGISTER

1881-82

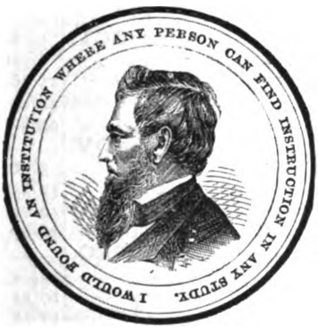
ITHACA, N. Y.

THE

CORNELL UNIVERSITY

REGISTER

1881-82



ITHACA, N. Y.

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1882	Sunday	Mond'y	Tuesd'y	Wednes.	Thurs.	Friday	Satur.
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J. Campbell,
Printer,
15 Vandewater St., N. Y.

CALENDAR.

1881.		
Sept. 13–15,	Tuesday–Thursday,	Entrance Examinations.
Sept. 15,	Thursday,	Registration Day.
Sept. 16,	Friday,	Instruction begins.
Nov. 24,	Thursday,	THANKSGIVING.
Dec. 12–16,	Monday–Friday,	Term Examinations.
Dec. 16,	Friday,	Term ends.
1882.		
Jan. 3–5,	Tuesday–Thursday,	Entrance Examinations.
Jan. 5,	Thursday,	Registration Day.
Jan. 6,	Friday,	Instruction begins.
Jan. 11,	Wednesday,	FOUNDER'S DAY.
Feb. 22,	Wednesday,	WASHINGTON'S BIRTHDAY.
March 3,	Friday,	Woodford Prize Competition.
March 20–24,	Monday–Friday,	Term Examinations.
March 24,	Friday,	Term ends.
April 1,	Saturday,	Registration Day.
April 3,	Monday,	Instruction begins.
May 15,	Monday,	Commencement Essays due.
May 24,	Wednesday,	Theses for Adv. Degrees due.
May 29,	Monday,	Senior Examinations and Examinations for Advanced Degrees begin.
May 30,	Tuesday,	DECORATION DAY.
June 5–9,	Monday–Friday,	Term Examinations.
June 12–14,	Monday–Wednesday,	Entrance Examinations.
June 13,	Tuesday,	Class Day.
June 14,	Wednesday,	Alumni Day, Annual Meeting of the Trustees.
June 15,	Thursday,	COMMENCEMENT.
Sept. 19–21,	Tuesday–Thursday,	Entrance Examinations.
Sept. 21,	Thursday,	Registration Day.
Sept. 22,	Friday,	Instruction begins.

CONTENTS.

ORGANIZATION AND GOVERNMENT.

FOUNDATION OF THE UNIVERSITY.

The existence of Cornell University is due to the bounty of the United States and of Ezra Cornell. On the second of July, 1862, Congress passed an act granting public lands to the several states which should "provide at least one college where the leading object shall be, without excluding other scientific and classical studies, and including military tactics, to teach such branches of learning as are related to agriculture and the mechanic arts." Thirty thousand acres for each of its senators and representatives in Congress were appropriated to every state; and the share of the State of New York was nine hundred and ninety thousand acres in land scrip.

On the twenty-seventh of April, 1865, the legislature of New York incorporated "The Cornell University," appropriating to it the income arising from the sale of this land scrip. The most important conditions were, that Ezra Cornell should give to the University five hundred thousand dollars; that it should give instruction in branches relating to agriculture, mechanic arts, and military tactics; and that it should receive, without charge for tuition, one student annually from each assembly district. Mr. Cornell fulfilled the first requirement of the charter, and made an additional gift of more than two hundred acres of land, with buildings, to be used as a farm in connection with the department of agriculture.

The act of incorporation satisfies the condition of the congressional grant by providing for instruction in such branches of learning as are related to agriculture and the mechanic arts, and in military tactics, "in order to promote the liberal and practical

education of the industrial classes in the several pursuits and professions of life." And it further declares that "such other branches of science and knowledge may be embraced in the plan of instruction and investigation pertaining to the University, as the trustees may deem useful and proper."

The University, organized in accordance with the requirements of its charter, was opened on the seventh of October, 1868.

TRUSTEES.

The number of Trustees, when the board is full, is twenty-three. The eldest male lineal descendent of the Founder is, by the law of the State, a trustee, and seven others, the President of the University, the Governor of New York, the Lieutenant Governor, the Speaker of the Assembly, the Superintendent of Public Instruction, the President of the State Agricultural Society, the Librarian of the Cornell Library.

Of the remaining fifteen two are elected annually by the trustees and one by the alumni. The term of every trustee not *ex officio* is five years.

FACULTY.

The Faculty consists of professors and assistant professors, and is aided by non-resident professors and lecturers, and by instructors and examiners. It comprises the following special faculties: Agriculture; Architecture; Chemistry and Physics; Civil Enngineering; History and Political Science; Ancient Classical Languages; Germanic Languages; Oriental Languages; Romance Languages; Mathematics; Mechanic Arts; Military Science; Natural History; Philosophy and Letters.

STATE STUDENTS.

The ninth paragraph of the original act of incorporation provides for the admission of one student, annually, from each assembly district without payment of tuition. The number thus received, if all the scholarships were filled, would be five hundred and twelve. These State Students are to be selected, by yearly competitive examinations, from the various academies and public schools of the State. It is the duty of the school commissioners of counties and boards of education of cities to hold and con-

duct such examinations, and to award the scholarships. No applicant is allowed to compete who has been admitted to the University; and in order to enter it, the successful candidate is subject to the same requirements in regard to scholarship as any other applicant. As the law requires the selection of "the best scholar," no distinction on account of sex is recognized in the competition. For further details regarding this subject see p. 95.

GRADUATE STUDENTS.

For purposes of advanced study the University extends its privileges to its own graduates and to graduates of like standing from other colleges and universities, and it confers advanced degrees under conditions described elsewhere; but graduate students who are not candidates for a degree are received in any department, and for any length of time.

HIGHER EDUCATION OF WOMEN.

By an act of the trustees, passed in April, 1872, women are admitted to the University on the same terms as men, except that they must be seventeen years old. A separate building, the Sage College, has been erected and furnished for their residence. The entrance examinations and all the studies, except military science, are the same for women as for men.

RELIGIOUS SERVICES.

The University, established by a government which recognizes no distinction of religious belief, seeks neither to promote any creed, nor to exclude any. By the terms of its charter, persons of any religious denomination or of no religious denomination are equally eligible to all offices and appointments, and it is expressly ordered that "at no time shall a majority of the board of trustees be of any one religious sect, or of no religious sect."

In the University Chapel—the gift of the Hon. Henry W. Sage—religious services are held, and discourses delivered by representative clergymen of the various Christian denominations. The gentlemen named below are those invited to officiate during the academic year 1881–82, on the days mentioned:

UNIVERSITY PREACHERS, 1881–82.
(On the Dean Sage Foundation.)

Sept. 25—Professor Moses Coit Tyler, LL.D.
Oct. 2—The Rev. Thomas R. Slicer, of Providence, R. I.
Oct. 9—The Rev. Phillips Brooks, D.D., of Boston, Mass.
Oct. 16—Ex-President Samuel G. Brown, D.D., of Hamilton College.
Oct. 23—The Rev. Alexander McKenzie, of Cambridge, Mass.
Oct. 30—Professor George L. Raymond, of the College of New Jersey.
Nov. 6—The Rev. Chauncey Giles, of Philadelphia, Pa.
Nov. 13—The Rev. George D. Boardman, D.D., of Philadelphia, Pa.
Nov. 20—The Rev. Washington Gladden, D.D., of Springfield, Mass.
Dec. 4—Professor W. P. Coddington, of Syracuse University.
Apr. 2—The Rt. Rev. Bp. Matthew Simpson, D.D., of Pennsylvania.
Apr. 9.—President Julius H. Seelye, D.D., LL.D., of Amherst College.
Apr. 16—The Rt. Rev. Bp. J. F. Hurst, D.D., of Iowa.
Apr. 23—Professor Geo. P. Fisher, D.D., LL.D., of Yale College.
Apr. 30—The Rt. Rev. Samuel Smith Harris, D.D., LL.D., Bishop of Michigan.
May 7.—President Edw. G. Robinson, D.D., LL.D., of Brown University.
May 14—The Rt. Rev. William Croswell Doane, D.D., Bishop of Albany.
May 21—The Rev. Brooke Hereford, D.D., of Chicago, Ill.
May 28—Principal Geo. M. Grant, of Queen's University, Canada.
June 4—The Rev. James Freeman Clarke, D.D., of Boston, Mass.
June 11 (Baccalaureate Sermon)—The Rev. Reginald Heber Newton, of Garden City, L. I.

BOARD OF TRUSTEES.

OFFICERS OF THE BOARD.

EXECUTIVE COMMITTEE.

FACULTY.

ARRANGED, WITH THE EXCEPTION OF THE OFFICERS OF THE FACULTY, IN THE ORDER OF SENIORITY OF APPOINTMENT.

HON. ANDREW DICKSON WHITE, LL.D., University Grounds
PRESIDENT, *Professor of History.*

REV. WILLIAM DEXTER WILSON, DD., LL.D., L.H.D., 109 Cascadilla
REGISTRAR, *Professor of Moral and Intellectual Philosophy.*

DANIEL WILLARD FISKE, A.M., Ph.D., University Grounds
LIBRARIAN, *Professor of North European Languages.*

GEORGE CHAPMAN CALDWELL, B.S., Ph.D., University Grounds
Professor of Agricultural and Analytical Chemistry, and Secretary of the Faculty.

BURT GREEN WILDER, B.S., M.D., 148 E. Buffalo St.
Professor of Physiology, Comparative Anatomy, and Zoölogy.

JAMES LAW, F.R.C.V.S., University Grounds
Professor of Veterinary Medicine and Surgery.

ALBERT NELSON PRENTISS, M.S., University Grounds
Professor of Botany, Horticulture, and Arboriculture.

JOHN LEWIS MORRIS, A.M., C.E., University Grounds
Sibley Professor of Practical Mechanics and Machine Construction.

THOMAS FREDERICK CRANE, A.M., University Grounds
Professor of Spanish and Italian, and Acting Professor of French.

ZIBA HAZARD POTTER, A.M., M.D., LL.B., Cascadilla Cottage
Assistant Professor of Mathematics, and Medical Examiner.

CHARLES ASHMEAD SCHAEFFER, A.M., Ph.D., 103 E. Seneca St.
Professor of General and Analytical Chemistry, and of Mineralogy.

FREDERICK OTTO LOUIS RŒHRIG, Ph.D., M.D., University Grounds
Professor of Sanskrit and Living Asiatic Languages, and Assistant Professor of French.

HIRAM CORSON, A.M., LL.D., 58 Cascadilla
Professor of Anglo-Saxon and English Literature.

WATERMAN THOMAS HEWETT, A.M., Ph.D., 22 W. Buffalo St.
Assistant Professor of German.

BELA PHILLIPS MACKOON, A.M., University Grounds
Associate Professor of German.

ALFRED STEBBINS, A.M., 108 N. Aurora St.
Assistant Professor of South European Languages.

LUCIEN AUGUSTUS WAIT, A.B., University Grounds
Associate Professor of Mathematics.

ISAAC FLAGG, Ph. D., 28 Mitchell St.
Professor of the Greek Language and Literature.

CHARLES CHAUNCY SHACKFORD, A.M., University Grounds
Professor of Rhetoric and General Literature.

REV. CHARLES BABCOCK, A.M., University Grounds
Professor of Architecture.

JAMES EDWARD OLIVER, A.M., 69 Heustis St.
Professor of Mathematics.

WILLIAM ARNOLD ANTHONY, Ph.B., 9 W. Buffalo St.
Professor of Physics and Experimental Mechanics.

ESTEVAN ANTONIO FUERTES, Ph.B., C.E., 170 E. State St.
Professor of Civil Engineering.

EDWIN CHASE CLEAVES, B.S., Cortland
Associate Professor of Freehand Drawing and Mechanical Drawing.

ISAAC PHILLIPS ROBERTS, M.Agr., University Grounds
Professor of Agriculture.

ABRAM ADAM BRENEMAN, B.S., 116 Cascadilla
Professor of Industrial Chemistry, and Assistant Professor of Analytical Chemistry.

CHARLES LEE CRANDALL, C.E., West Hill
Assistant Professor of Engineering.

IRVING PORTER CHURCH, C.E., 152 E. Seneca St.
Assistant Professor of Engineering.

HORATIO STEVENS WHITE, A.B., University Grounds
Professor of the German Language and Literatuse.

JOHN HEMRY COMSTOCK, B.S., University Grounds
Assistant Professor of Entomology, and Lecturer on the Zoölogy of Invertebrates.

WILLIAM RUSSELL DUDLEY, M.S., 108 Cascadilla
Assistant Professor of Botany.

JAMES BRATTLE BURBANK, Brevet Maj. 3d Art., U.S.A., Corner E. Seneca and Quarry Sts.
Professor of Military Science and Tactics.

GEORGE WILLIAM JONES, A.M., 17 Factory St.
Assistant Professor of Mathematics.

SAMUEL GARDNER WILLIAMS, A.M., Ph.D., 127 E. Buffalo St.
Professor of General and Economic Geology.

HENRY SHALER WILLIAMS, Ph.D., 32 W. Green St.
Assistant Professor of Palaeontology.

WILLIAM RUFUS PERKINS, A.B., 142 E. Seneca St.
Assistant Professor of Latin and Greek.

GEORGE SYLVANUS MOLER, B.M.E., 156 N. Aurora St.
Assistant Professor of Physics.

WILLIAM GARDNER HALE, A.B., 100 Cascadilla
Professor of the Latin Language and Literature.

WALTER CRAIG KERR, B.M.E., Corner Buffalo and Quarry Sts.
Assistant Professor of Mechanics.

JOHN BURKITT WEBB, C.E., University Grounds.
Professor of Applied Mathematics and Theoretical Mechanics.

SIMON HENRY GAGE, B.S., 149 Cascadilla
Assistant Professor of Physiology, and Lecturer on Microscopical Technology.

WILLIAM EDWARD LUCAS, Ph.B., 122 Cascadilla.
Assistant Professor of Rhetoric and Composition.

CHARLES FRANCIS OSBORNE, 42 Eddy St.
Assistant Professor of Architecture.

MOSES COIT TYLER, LL.D., 65 Cascadilla. V
Professor of American History and Literature.

LECTURERS AND NON-RESIDENT PROFESSORS.

GOLDWIN SMITH, LL.D., L.H.D., Toronto, Canada
Lecturer on English Constitutional History.

CHARLES HALLET WING, B.S., Jamaica Plain, Mass.
Non-Resident Professor of Organic Chemistry.

HERBERT TUTTLE, A.M., 152 E. Seneca St.
Non-Resident Professor of International Law.

Henry Carter Adams, Ph.D., Ann Arbor, Mich.
Non-Resident Professor of Political Economy.

Charles Kendall Adams, LL.D., Ann Arbor, Mich.
Non-Resident Professor of English Constitutional History.

Edward Augustus Freeman, D.C.L., Oxon., Wells, England
Lecturer (for the current year) on General European History.

INSTRUCTORS.

Madison Monroe Garver, B.S., 120 Cascadilla
Instructor in Chemistry and Mineralogy.

Stephen Moulton Babcock, Ph.D., West Hill
Instructor in Chemistry.

George Lincoln Burr, A.B., University Grounds
Instructor and Examiner in Modern History.

OTHER OFFICERS.

Wesley Newcomb, M.D., 23 Quarry St.
Curator of the Newcomb Collection of Shells.

George William Harris, Ph.B., 142 E. Seneca St.
Assistant Librarian.

Spencer Baird Newbury, E.M., Ph.D., 152 E. Seneca St.
Chemical Analyst to the Agricultural Station.

Benjamin Hermon Smith, Cortland
Director of the University Press.

George W. Tailby, University Grounds
Foreman of the Farm.

Miles Lorin Clinton, 17 W. Buffalo St.
Foreman of the Machine Shop.

Albert Franklin Matthews, 43 N. University Building
Master of the Chimes.

William Ogden Kerr, 11 S. University Building
Meteorological Observer.

Ernest Emmery Russell, 54 N. University Building
Janitor.

SPECIAL FACULTIES.

AGRICULTURE—The PRESIDENT, Professor ROBERTS, Professors CALDWELL, LAW, PRENTISS, WILDER, S. G. WILLIAMS, and COMSTOCK.

ARCHITECTURE—The PRESIDENT, Professor BABCOCK, Professors FUERTES. OLIVER, CLEAVES, and OSBORNE.

CHEMISTRY AND PHYSICS—The PRESIDENT, Professor SCHAEFFER, Professors ANTHONY, CALDWELL, BRENEMAN, and MOLER.

CIVIL ENGINEERING—The PRESIDENT, Professor FUERTES, Professors ANTHONY, BABCOCK, MORRIS, OLIVER, SCHAEFFER, CHURCH, and CRANDALL.

HISTORY AND POLITICAL SCIENCE—The PRESIDENT, Professors FLAGG, HALE, TYLER, and WILSON.

ANCIENT CLASSICAL LANGUAGES AND LITERATURE—The PRESIDENT, Professor FLAGG, Professors HALE and PERKINS.

GERMANIC LANGUAGES AND LITERATURE—The PRESIDENT, Professor FISKE, Professors MACKOON, HEWETT, and WHITE.

ROMANCE LANGUAGES AND LITERATURE—The PRESIDENT, Professor CRANE, Professors RŒHRIG and STEBBINS.

ORIENTAL LANGUAGES AND LITERATURE—The PRESIDENT, Professors FISKE, RŒHRIG, and WILSON.

MATHEMATICS—The PRESIDENT, Professor OLIVER, Professors ANTHONY, BABCOCK, FUERTES, MORRIS, WEBB, WAIT, JONES, and POTTER.

THE SIBLEY COLLEGE OF MECHANIC ARTS—The PRESIDENT, Professor MORRIS, Professors ANTHONY, BABCOCK, FUERTES, WEBB, OLIVER, KERR, and CLEAVES.

MILITARY SCIENCE AND TACTICS—The PRESIDENT, Professors BURBANK, WILSON, and POTTER.

NATURAL HISTORY—The PRESIDENT, Professor PRENTISS, Professors LAW, WILDER, WILSON, S. G. WILLIAMS, H. S. WILLIAMS, COMSTOCK, DUDLEY, and GAGE.

PHILOSOPHY AND LETTERS—The PRESIDENT, Professor SHACKFORD, Professors CORSON, WILSON, and LUCAS.

CATALOGUE OF STUDENTS.

GRADUATES.

Resident—Candidates for a Degree.

Burr, George Lincoln, A.B., *History and Political Science*
Ferguson, Willis Edwin, B.S., Main Agr. Coll. *Agriculture*
Kephart, Horace Sauers, A.B., Lebanon Valley Coll. *History and Political Science*
Kilborne, Fred Lucius, Agr.B., *Veterinary Science*
Petit, Amelie Veronica, Ph.B., Syracuse Univ. *History and Literature*
Rich, Fred William, B.S., *Chemistry and Physics*
Roberts, Mary Elizabeth, Ph.B., *History and Political Science*
Whitney, Frank Curtis, A.B., *Ancient Classical Languages and Literature*

Non-Resident—Candidates for a Degree.

Hahn, Albert George Charles, Agr.B., *Chemistry and Mineralogy*
Harlow, Gertrude Burt, A.B., *Ancient Classical Languages and Literature*
Hunter, Nathaniel Perry, A.B., *History and Political Science*
Jayne, Delos Dan, B.S., *History and the German Language*
Pitcher, Mary Merrill, A.B., *Ancient Classical Languages and Literature*
Roberts, Emma Sellew, A.B., *Greek Language and Literature*
Rose, Alice Evelyn, B.S., *Modern Languages*
Severance, Frank Hayward, B.S., *History and Political Science*

Resident—Not Candidates for a Degree.

Carman, Frederick Douglass, A.B., *History and Political Science*
Hough, Romeyn Beck, A.B., *Zoölogy and Comparative Anatomy*
Humphrey, Charles, B.S., *Natural History*
Jonas, Albert, B.S., *History and Political Science*
Stearns, James Brainard, A.B., *History and Political Science*
Varnum, Vandelia, Ph.B., Alfred Univ. *History and Literature*

LICENTIATE.

Chittenden, Frank Hurlbut, *Natural History*

UNDERGRADUATES.

Candidates for a Degree.

Seniors.

Adams, John Davis,	Plainville,	*Literature*
Ayers, Mary Frances,	Ithaca,	*Literature*
Bacon, Charles Putnam,	Elmira,	*Philosophy*
Blachstein, Arthur,	New York City,	*Arts*
Brown, Ellen Coit,	Ithaca,	*Science and Letters*
Brown, Frederick Lord,	Sag Harbor,	*Architecture*
Brunn, Armin Earnest,	Brooklyn,	*Agriculture*
Carlson, Eleanore Frederica,	Owego,	*Literature*
Casey, Patrick Joseph,	Binghamton,	*Arts*
Catlin, Frederick Miles,	Erie, Pa.,	*Arts*
Chester, Frederick Dixon,	St. Louis, Mo.,	*Sc. and Letters*
Coe, Alfred Byron,	Oswego,	*Science and Letters*
Cole, Chester Glen,	Corning,	*Literature*
Collins, Homer,	Rochester,	*Natural History*
Corbett, Flora Josephine,	Clayville,	*Arts*
Cowell, Alexander Tyng,	Erie, Pa.,	*Literature*
Curtis, Ida Maynard,	Boston, Mass.,	*Sc. and Letters*
Cushing, Harry Platt,	Cleveland, O.,	*Philosophy*
Dibble, Henry Montgomery,	Marshall, Mich.,	*Literature*
Fairchild, Tracy Rasselas,	Ovid,	*Engineering*
Fay, Lewis George,	Burlington,	*Arts*
Fowler, Mary,	Gouverneur,	*Science and Letters*
Gill, Francis Beaman,	Antwerp,	*Science and Letters*
Grant, Edith,	New York City,	*Philosophy*
Harding, William Elias,	Bethany,	*Agriculture*
Hiscock, Albert King,	Syracuse,	*Arts*
Horr, Norton Townshend,	Wellington, O.,	*Sc. and Letters*
Horr, Rollin Cortland,	Wellington, O.,	*Sc. and Letters*
Kenney, Eudorus Catline,	Truxton,	*Mathematics*
Kent, William Archie,	Oil City, Pa.,	*Science and Letters*
Krüsi, Hermann,	Oswego,	*Engineering*
Leary, Frank,	Ithaca,	*Science and Letters*
Luckey, Frank Ranney,	Poughkeepsie,	*Sc. and Letters*
McClelland, Robert Watson,	Pittsburg, Pa.,	*Sc. and Letters*
Pierce, Daniel Addison,	Baldwinsville,	*Philosophy*

Purdy, Markwell Seward,	Corning,	*Science and Letters*
Rackemann, Felix,	Lenox, Mass.,	*Science and Letters*
Rappleye, Walker Glazier,	Minetto,	*Science and Letters*
Reed, Jared Ackerson,	Ontario,	*Science and Letters*
Sazé, Hidesabro,	Wakamatsu, Japan,	*Agriculture*
Schenck, Herbert Dana,	Union Springs,	*Natural History*
Sears, Stephen Parrish,	Buffalo,	*Literature*
Shiras, Winfield Kennedy,	Pittsburg, Pa.,	*Sc. and Letters*
Smith, Isaac Parshall,	Ithaca,	*Arts*
Soper, Grace Weld,	Waltham, Mass.,	*Arts*
Spencer, Stella Diantha,	Unadilla,	*Philosophy*
Streeter, Howard Malcom,	Tunkhannock, Pa.,	*Arts*
Suydam, Frederick,	Baldwinsville,	*Science and Letters*
Thompson, Madeleine Sylvester,	Passaic, N. J..	*Sc. and Letters*
Trumbull, William,	Sandy Hill,	*Engineering*
Tuthill, James Fred,	Corning,	*Arts*
Van Pelt, Elizabeth Vredenburgh,	Roselle, N. J.,	*Sc. and Letters*
Wait, John Cassan,	Norwich,	*Engineering*
Waldo, Gerald,	Scotland, Conn.,	*Agriculture*
Webster, John Gurdon,	Bath,	*Natural History*
White, Fred Davies,	Ithaca,	*Science and Letters*
Woodard, James Allen,	Elma,	*Science and Letters*
Wright, George Herdman,	Washington, D. C.,	*Arts*
Yeaw, Everett.	Lawrence, Mass.,	*Arts*

Juniors.

Alling, Asa Alling,	Bangall,	*Philosophy*
Anderson, Charles Henry,	Griggsville, Ill.,	*Literature*
Avery, Charles Irving,	Auburn,	*Science and Letters*
Avery, James Carrington,	Auburn,	*Science and Letters*
Beye, John Charles,	Elgin, Ill.,	*Engineering*
Booth, Irving Edward,	Rochester,	*Mechanic Arts*
Boulton, Jessie Mary,	Jamestown,	*Literature*
Boyer, Lyman Fremont,	Freeport, Ill.,	*Science and Letters*
Brainard, George Austin,	Higganum, Conn.,	*Sc. and Letters*
Browning, Charles Ross,	Orange, N. J.,	*Literature*
Bullock, George,	Cincinnati, O.,	*Mechanic Arts*

Chase, Charles Curry,	Schenevus,	*Science and Letters*
Cobb, William Howard,	Andover,	*Agriculture*
Crooker, Edward Henry,	Minneapolis, Minn.,	*Literature*
Curtis, Charles Locke,	Newfield,	*Arts*
Cushing, Edward Fitch,	Cleveland, O.,	*Sc. and Letters*
Diefendorf, Mary Riggs,	Brooklyn,	*Arts*
Dix, John Alden,	Glens Falls,	*Science*
Dowling, Eunice,	Bradford,	*Arts*
Downing, Elizabeth,	Ithaca,	*Science and Letters*
Duryea, Edwin,	Craigsville,	*Engineering*
Dwellé, William Delafield,	Penn Yan,	*Arts*
Eaton, William Moser,	Ithaca,	*Philosophy*
Ehrman, Harry,	Decatur, Ill.,	*Science and Letters*
Elmer, Herbert Charles,	Rushford,	*Arts*
Ewing, William Bion,	Huntington, Ind.,	*Engineering*
Fuertes, James Hillhouse,	Ithaca,	*Engineering*
Holton, Frederick Arthur,	Washington, D.C.,	*Chem. & Physics*
Humphries, John Henry,	Syracuse,	*Literature*
Lillis, Thomas Francis,	Coventryville,	*Mechanic Arts*
Longwell, Harry Edgar,	Monongahela City, Pa.,	*Mech. Arts*
Lyon, John,	Schultzville,	*Science and Letters*
Mapes, Arlington,	Rushville,	*Arts*
Marshall, Holmes,	Cleveland, O.,	*Arts*
Matthews, Albert Franklin,	Orange, N. J.,	*Arts*
Matthews, Ross,	Pittsfield, Ill.,	*Optional*
Maxwell, Emma Eliza,	North Clymer,	*Sc. and Letters*
McGraw, De Witt Hiram,	Binghamton,	*Arts*
Page, William Henry,	Stafford,	*Engineering*
Patterson, Roswell Henry,	Herrick Centre, Pa.,	*Sc. and Letters*
Pearson, Edward Jones,	Sedalia. Mo.,	*Engineering*
Place, Edwin,	Cincinnatus,	*Engineering*
Pratt, John Lovejoy,	Buskirk's Bridge,	*Literature*
Prentiss, Evarts Lincoln,	Penn Yan,	*Literature*
Preswick, Eugene Henry,	Ithaca,	*Science and Letters*
Prosser, Charles Smith,	Brookfield,	*Science*
Raynor, George Cartwright,	Riverhead,	*Science and Letters*
Reed, Charles,	Senaju, Guatemala,	*Sc. and Letters*
Reed, James William,	Warrensburg,	*Engineering*
Rhodes, Frances,	Trempealeau, Wis.,	*Architecture*

Roberts, Willis Markel,	Seneca Falls,	*Mechanic Arts*
Roehrig, Fred Lewis,	Ithaca,	*Architecture*
Ruggles, William Benjamin,	Bath,	*Mechanic Arts*
Runyon, Frank Willits,	Plainfield, N. J.,	*Literature*
Sheldon, Daniel Corydon,	Delphi,	*Engineering*
Sibley, Lucy Culver,	Cuba,	*Science and Letters*
Smith, Clara Maria,	Palmyra,	*Literature*
Smith, Delano Eugene,	New York City,	*Sc. and Letters*
Smith, John Campbell,	Cleveland, O.,	*Mechanic Arts*
Southwick, John Leonard,	Bombay,	*Literature*
Sullivan, Frank Robert,	Pompey Centre,	*Optional*
Thayer, George Henry,	Plymouth, Ind.,	*Sc. and Letters*
Tomkins, Walter,	Newark, N. J.,	*Sc. and Letters*
Tucker, John Thomas,	Varna,	*Agriculture*
Turner, Ebenezer Tousey,	Ithaca,	*Engineering*
Turner, Henry Ward,	Vineland, N. J.,	*Natural History*
Washburn, Frank Sherman,	Chicago, Ill.,	*Engineering*
Wetherell, Jane Johnson,	Philadelphia, Pa.,	*Sc. and Letters*
Wilcox, Fred Clarence,	Ithaca,	*Arts*
Wilcox, Fred Elmer,	Ithaca,	*Agriculture*
Woodruff, Cora Eliza,	Ithaca,	*Arts*

Sophomores.

Aiken, George David,	Tioga, Pa.,	*Science and Letters*
Avila, Arao Ferreira de,	San Paulo, Brazil,	*Mechanic Arts*
Bassett, Emma Neal,	Cooper's Plains,	*Philosophy*
Bering, Wilson Morrison,	Decatur, Ill.,	*Science and Letters*
Brewster, Charles Albert,	Addison,	*Science and Letters*
Brown, Julia Wells,	Holland Patent,	*Optional*
Brownell, Hart Murray,	Nyack,	*Architecture*
Burrows, James Bering,	Decatur, Ill.,	*Science and Letters*
Carpenter, Fred Wisner,	Owego,	*Engineering*
Carpenter, George M.,	Waverly, Pa.,	*Agriculture*
Carter, William Alexander,	Fort Bridger, Wy.T.,	*Engineering*
Cassedy, William Fraser,	Newburg,	*Science and Letters*
Chisholm, Charles Fillmore,	Chazy,	*Optional*
Coimbra, Anastacio Rodrigues de Aquino,	Trez Ilhas, Brazil,	*Mechanic Arts*

Cole, Romaine Clark,	New York City,	*Chem. and Physics*
Coles, Franklin Albert,	Glen Cove,	*Science and Letters*
Collmann, Onnie Janssen,	Freeport, Ill.,	*Science and Letters*
Coman, Charles Walter,	Kankakee, Ill.,	*Nat. History*
Cornell, Ida,	Central Valley,	*Sc. and Letters*
Cowles, Lewis Hutchinson,	Cleveland, O.,	*Philosophy*
Curnow, George Trevilyan,	Brooklyn,	*Mechanic Arts*
Davidson, George Bruce,	Scranton, Pa.	*Sc. and Letters*
De Forest, Harry Pelouze,	Fulton,	*Science and Letters*
Dietz, John Fanning,	Schoharie,	*Science and Letters*
Doubleday, Julia Louisa,	Binghamton,	*Philosophy*
Drury, John Maynerd,	Vail's Mills,	*Science and Letters*
Ensign, Orville Hiram,	Ithaca,	*Mechanic Arts*
Fish, Fred Starr,	Cedarville,	*Science and Letters*
Freeman, William Neely,	Sherburne,	*Arts*
Gage, Maud,	Fayetteville,	*Literature*
Gambee, Linnie,	Fayette,	*Science and Letters*
Green, Rufus Lot,	Ogden, Ind.,	*Mathematics*
Grotecloss, Hattie Elizabeth,	New York City,	*Natural History*
Hamilton, Alexander,	San Francisco, Cal.,	*Sc. and Letters*
Hasbrouck, Charles Alfred,	Ithaca,	*Engineering*
Hillger, Samuel Ernest,	New Orleans, La.,	*Architecture*
Howard, William Turner,	New York City,	*Sc. and Letters*
Howland, Herbert Slocum,	Sherwood,	*Agriculture*
Huffcut, Ernest Wilson,	Afton,	*Science and Letters*
Ingalls, Frank Percy,	Salem, Mass.,	*Chem. and Physics*
Jones, Anna Lizzie,	Trumansburg,	*Philosophy*
Krauss, William Christopher,	Attica,	*Science and Letters*
Lapham, Ludlow Eliakim,	Penn Yan,	*Arts*
Larned, William Henry,	Poland,	*Engineering*
Levi, Louis Eleazer,	Buffalo,	*Science and Letters*
Lewis, George Washington,	Buffalo,	*Arts*
Linn, William Walton,	Decatur, Ill.,	*Science and Letters*
Maguire, Edward,	Seward,	*Science and Letters*
McLoughlin, James,	New York City,	*Sc. and Letters*
Monroe, Elmon,	Silver Creek,	*Arts*
Murphy, Edward Charles,	Phœnix,	*Engineering*
Oakes, Helen Mar,	Steuben,	*Science and Letters*
Olin, Fred,	Perry,	*Mechanic Arts*

Overton, Floyd Carter,	Belleville,	*Arts*
Patten, Henry Joyce,	Sandwich, Ill.,	*Philosophy*
Payne, Lewis Taber,	Tonawanda,	*Science and Letters*
Poucher, Warren Allen,	Oswego,	*Mechanic Arts*
Randolph, Cyrus,	Decatur, Ill.	*Literature*
Robinson, Clarence Isaac,	Mt. Vision,	*Chem. and Physics*
Rose, Hudson Parmelee,	Cleveland, O.,	*Literature*
Russell, Ernest Emory,	Havana,	*Optional*
Scofield, Frank Graham,	Fishkill,	*Engineering*
Shaler, Ira Alexander,	New York City,	*Engineering*
Shively, Harry Laurence,	Indianapolis, Ind.,	*Science*
Sibley, Herbert Delano,	Randolph,	*Arts*
Smith, Charlotte,	Smith's Mills,	*Philosophy*
Sprout, Helen Louise,	Brooklyn,	*Science and Letters*
Spurr, Marcia Edith,	South Edmeston,	*Sc. and Letters*
Stambaugh, John Tod,	Youngstown, O.,	*Philosophy*
Story, Elmer Gildersleeve,	Schultzville,	*Science and Letters*
Thorp, Charles Monroe,	Oil City, Pa.,	*Philosophy*
Tinsley, Henry Greenwood,	Lyons,	*Science and Letters*
Tuthill, Lewis Henry,	Corning,	*Optional*
Van Dusen, Gertrude Frances,	Geneva,	*Arts*
Van Ostrand, Byron Dean,	Marion,	*Science and Letters*
Van Sickle, John,	Cayuga,	*Science and Letters*
Van Valkenberg, Willis,	Ithaca,	*Optional*
Walch, Charles John,	Syracuse,	*Science and Letters*
Ware, Richard,	Washington, D. C.,	*Optional*
Waring, John,	Ovid,	*Mechanic Arts*
Webb, Walter Loring,	Cortland,	*Engineering*
Weed, Oscar Dillwyn,	North Rose,	*Arts*
Welles, Nelson Ackley,	Elmira,	*Agriculture*
Williams, Timothy Shaler,	Ithaca,	*Arts*
Wilson, Charles Bundy,	Geddes,	*Arts*
Wilson, Edward Fay,	Ithaca,	*Agriculture*
Wright, Horton Daniel,	Hoosick Falls,	*Sc. and Letters*
Wyckoff, James Newton,	Perry,	*Science and Letters*

Freshmen.

Anthony, Charles Chapman,	Ithaca,	*Philosophy*
Avery, Adaline Maria,	Phœnix,	*Science and Letters*
Baker, Edward Everett,	Cedar Hill,	*Science and Letters*
Bardwell, Arthur Francis,	Springfield, Mass.,	*Engineering*
Beidler, Herbert Alpine,	Chicago, Ill.,	*Science and Letters*
Benedict, Frederick Staples,	Brockport,	*Architecture*
Bennett, Burton Ellsworth,	North Brookfield,	*Sc. and Letters*
Bickford, Chauncey Howard,	Belleville,	*Arts*
Bliss, Russell Joseph,	Peterboro,	*Optional*
Blood, Arthur Raymond,	Erie, Pa.,	*Engineering*
Boshart, Charles Fred,	Lowville,	*Agriculture*
Bostwick, Edward Hermon,	Ithaca,	*Science and Letters*
Boulton, Sadie Scott,	Jamestown,	*Science and Letters*
Brooks, Edgar Gerson,	Salt Lake City, Utah,	*Sc. and Letters*
Brundage, Charles Hubert,	Penn Yan,	*Optional*
Bull, Edward Leonard,	Slaterville,	*Science and Letters*
Bull, John, Jr.,	Slaterville,	*Science and Letters*
Burgess, Charles Otis,	Kelloggsville,	*Agriculture*
Burr, Lucius Franklin,	St. Johnsville,	*Sc. and Letters*
Carey, Chester Addison,	Scotland, Conn.,	*Agriculture*
Carpenter, Carrie,	Waverly, Pa.,	*Science and Letters*
Case, Howard Emmet,	Fulton,	*Science and Letters*
Church, Wilmer,	High Falls,	*Mechanic Arts*
Clock, Cora May,	Ithaca,	*Science and Letters*
Cooper, Edgar Howland,	New York City,	*Engineering*
Collins, Edward Hiram,	Syracuse,	*Science and Letters*
Curtis, Charles Elbert,	Ithaca,	*Engineering*
Davenport, Mason Bosworth,	Varna,	*Science and Letters*
Dearstyne, Florence Evelyn,	Sandy Hill,	*Science and Letters*
Decker, Delbert Harvey,	Fulton,	*Optional*
Doolittle, Clarence Everett,	Washington, D. C.,	*Engineering*
Dowling, Jonathan Lockwood,	Bradford,	*Mechanic Arts*
Durand, Fred Coye,	Westfield,	*Engineering*
Eidlitz, Robert James,	New York City,	*Architecture*
Elliott, Orrin Leslie,	Centreville,	*Optional*
Falkenau, Harry,	New York City,	*Literature*
Fisher, Bertrand Hand,	Wellington, O.,	*Engineering*

Fitzgerald, Hattie,	Monroe,	*Mathematics*
French, Eldon Lewis,	Housatonic, Mass.,	*Mech. Arts*
Genung, Albert Smith,	Ithaca,	*Science and Letters*
Giddings, Clara Curtis,	Jefferson, O.,	*Literature*
Good, Arthur Carroll,	Buffalo,	*Science and Letters*
Graves, Elma,	Richmond, Ind.,	*Sc. and Letters*
Hall, Charles Lee,	Canisteo,	*Engineering*
Hamp, Walter Francis,	Manchester, England,	*Engineering*
Hanford, Frank Ely,	Mason City, Iowa,	*Engineering*
Hartzell, Albert Ankeny,	Buffalo,	*Science and Letters*
Hebersmith, Ernest, Jr.,	San Francisco, Cal.,	*Nat. History*
Hettinger, Mathias,	Freeport, Ill.,	*Science and Letters*
Hixson, Edward Bryan,	Ithaca,	*Engineering*
Holman, Sidney Smith,	Bolton, Mass.,	*Mechanic Arts*
Hooker, Carrie Augusta,	Ithaca,	*Arts*
Hough, Elida Crofoot,	Lowville,	*Optional*
Illston, Henry Benjamin,	Ithaca,	*Mechanic Arts*
Kelley, Charles Lester,	Arcadia,	*Engineering*
Kellogg, Harry Whiting,	Shelburne, Mass.,	*Mechanic Arts*
Kittenger, George Bachelder,	Wilmington, Del.,	*Engineering*
Lain, David Emmet,	West Town,	*Mechanic Arts*
Laney, Lydia Hunt,	Waterloo,	*Philosophy*
Law, John Edwin,	Ithaca,	*Chemistry and Physics*
Lay, William Russell,	Oil City, Pa.,	*Architecture*
Lima, Casimiro Eugenio Amoroso,	Rio Janeiro, Brazil,	*Agriculture*
Magee, James,	Philadelphia, Pa.,	*Optional*
Marshall, Charles Henry,	Chatham,	*Arts*
McCall, James,	Bath,	*Arts*
McNish, Elmer,	Horseheads,	*Engineering*
Mead, Daniel Webster,	Rockford, Ill.,	*Engineering*
Merry, Martha,	Phœnix,	*Science and Letters*
Mosscrop, Alfred Mitton,	Brooklyn,	*Engineering*
Mott, Mary Lulo,	Alburg, Vt.,	*Optional*
Olin, Franklin Walter,	Buskirk's Bridge,	*Engineering*
Olmsted, Henry Collier,	Binghamton,	*Arts*
Powell, George Wilson,	Reed's Corners,	*Engineering*
Prescott, Frederick Mars,	Marinette, Wis.,	*Mechanic Arts*
Raht, Carl August,	Frisco, Utah,	*Engineering*
Reed, Edward Charles,	San José, Cal.,	*Engineering*

Reno, Robert Ross,	Pittsburg, Pa.,	*Sc. and Letters*
Repine, Wilbur Enoch,	Kendallville, Ind.,	*Mechanic Arts*
Sage, Adolphus Hiram,	South New Berlin,	*Sc. and Letters*
Seymour, Louis Hoard,	Ogdensburg,	*Science and Letters*
Seymour, Ralph Crysler,	Ogdensburg,	*Mechanic Arts*
Sherman, Willis Sheldon,	Marinette, Wis.,	*Engineering*
Smith, Albert Hale,	Franklin, Pa.,	*Sc. and Letters*
Smith, Charles Henry,	New Haven,	*Mechanic Arts*
Smith, Chester Mansfield,	Baltimore, Md.,	*Agriculture*
Smith, Fred Bigelow,	Tioga, Pa.,	*Science and Letters*
Smith, Jeannie Azilla	Bath,	*Science and Letters*
Smith, Wilbur Hazelton,	Little Valley,	*Optional*
Smith, William Charles,	Bath,	*Engineering*
Snow, Benjamin Warner,	La Salle, Ill.,	*Chem. and Physics*
Snyder, Charles Earl,	Herkimer,	*Science and Letters*
Steere, Asel, Jr.,	South New Berlin,	*Sc. and Letters*
Stevens, Stoddard More,	Rome,	*Optional*
Stowell, Willie Mix,	Brighton,	*Mechanic Arts*
Swartwout, Henry B.,	Huguenot,	*Science and Letters*
Swartz, Karl,	Cortland,	*Optional*
Taber, Lucretia Hathaway,	New Bedford, Mass.,	*Arts*
Thorpe, Clayton Miller;	Napoli,	*Engineering*
Towl, Forrest Milton,	Elmira,	*Engineering*
Trick, Willis Samuel,	Stafford,	*Mechanic Arts*
Upton, Wallace Lincoln,	Clymer,	*Mechanic Arts*
Veiga, Saturnino Ferreira da, Jr.,	Rio Janeiro, Brazil,	*Engineering*
Waterman, William Henry,	Cumberland Hill, R. I.,	*Arts*
Wendell, Emory Brady,	Detroit, Mich.,	*Mechanic Arts*
White, Kate Tucker,	Utica,	*Science and Letters*
Willard, Julia Etta,	Watertown,	*Literature*
Wood, Phœbe Jane,	Portville,	*Science and Letters*
Yawger, John Francis,	Union Springs,	*Engineering*

Optional and Special Students.

Not Candidates for a Degree.

Balestier, Charles Wolcott,	Rochester,	*Optional*
Boyer, Arthur Grindage,	Aurora,	*Special, Vet. Science*
Bronk, Edmund Franklin,	New Baltimore,	*Med. Preparatory*
Carolan, Frank,	San Francisco, Cal.,	*Optional*
Carr, James Stewart,	East Bloomfield,	*Hist. & Polit. Sci.*
Chappell, Fred Martin,	Montezuma,	*Med. Preparatory*
Cole, George Llewellyn,	Morrisville,	*Med. Preparatory*
Cowles, Alfred Hutchinson,	Cleveland, O.,	*Optional*
Crandall, George Hazard,	Almond,	*Hist. and Polit. Sc.*
Crawford, John Kerr,	Franklin, Pa.,	*Sp., Chem. & Assaying*
Ditmars, George Ford,	Ovid Centre,	*Hist. and Polit. Sc.*
Ely, Arthur Courtland,	Boston, Mass.,	*Optional*
Follmer, Elmer Sherman,	Watsontown, Pa.,	*Optional*
Ford, Charles Wesley,	Bushnell's Basin,	*Sp., Agriculture*
Goodale, Frederick Willett,	Scranton, Pa.,	*Special, Mech. Arts*
Haldeman, Frank Mackenzie,	Cleveland, O.,	*Special, Chemistry*
Hamilton, William Vallance,	Caledonia,	*Optional*
Henderson, Margaret,	Aylmer, Canada,	*Optional*
Hill, William,	Skaneateles,	*Optional*
Hœfler, John Lincoln,	Ilion,	*Special, Mechanic Arts*
Hoffman, Harry Natt,	Elmira,	*Optional*
Jones, Charles Sumner,	Middlesex,	*Hist. and Polit. Sci.*
McLennan, Roderick,	Elgin,	*Hist. and Polit. Sc.*
McLennan, Christina,	Elgin,	*Optional*
McMillan, Frank M.,	Buffalo,	*Hist. and Polit. Sc.*
Miller, Thomas Benedict,	Penn Yan,	*Special Vet. Science*
Morse, Everett Fleet,	Algona, Iowa,	*Optional*
Musser, Frank Reber,	Muncy, Pa.,	*Med. Preparatory*
Nash, Horace Woodworth,	Ithaca,	*Med. Preparatory*
Norton, Charles David,	Elmira,	*Optional*
Smith, James Archibald,	Ithaca,	*Optional*
Smith, Walter Gifford,	Sherburne,	*Sp., Hist. and Polit. Sc.*
Waldo, Jessie,	Scotland, Conn.,	*Optional*
Washburne, Lucy Mariona,	Ithaca,	*Optional*
Whaley, James Higgins,	Rome,	*Med. Preparatory*

SUMMARY.

GRADUATES,		22
LICENTIATE,		1
UNDERGRADUATES,		
Seniors,	59	
Juniors,	71	
Sophomores,	88	
Freshmen,	108	
Optional and Special,	35	
		361
Total,		384

ADMISSION.

ENTRANCE EXAMINATIONS.

The Primary Examination for Admission to the University.

All candidates for admission, except those provided with certificates or diplomas as specified below, are examined as follows:

1. In *English Grammar;* Whitney's Essentials of English Grammar is the standard. A short composition is required as a test of the candidate's knowledge of spelling, punctuation, the use of capitals, and elementary English construction.

2. In *Geography*, political and physical; as much as is contained in Harper's School Geography, or in Warren's Common School Geography.

3. In *Physiology;* as presented in the smaller text-books upon the subject, exclusive of the nervous system and the names of bones and muscles.

4. In *Arithmetic*, including the metric system of weights and measures; as much as is contained in the larger text-books.

5. In *Plane Geometry;* as much as is contained in the first five books of Chauvenet's Treatise on Elementary Geometry, or in the first five books of Wentworth's Elements of Plane and Solid Geometry, or in the first six books of Newcomb's Elements of Geometry.

6. In *Elementary Algebra*, through quadratic equations, and including radicals and the theory of exponents; as much as is contained in the first twelve sections of Loomis's Treatise on Algebra, or in Olney's Elementary Course in Algebra, or in the first five sections of Robinson's University Algebra.

In place of these examinations certain certificates or diplomas are received as follows:

1. *Certificates* issued by the *Regents* of the State of New York are accepted instead of the examinations in English Grammar, Geography, and Arithmetic.

2. *Certificates* issued by the *Superintendent of Public Instruction* of the State of New York, and *Diplomas* issued by the state normal schools, and by those academies and high schools of the State of New York whose requirements for graduation have been approved by the Faculty, and whose course of study requires Physiology and Plane Geometry, are accepted instead of the examinations in all the subjects named above *except Algebra.*

3. *Diplomas* issued by the *Regents* to graduates from the high schools and academies of the State of New York are accepted instead of the examinations in all the subjects named.

Candidates must be of good moral character and at least *sixteen* years of age, or, if women, *seventeen.*

Examinations for Admission to the Several Courses.

The requirements for admission to the courses in *Agriculture, Architecture, Civil Engineering,* and *Mechanic Arts,* are the same as those for admission to the University; but for admission to any of the other regular courses of study, the examinations, *in addition to the Primary Examination,* are as follows:

To the Courses in Science, Science and Letters, Mathematics, and Chemistry and Physics.

In addition to the Primary Examination, an examination in *any one* of the following sets of subjects:

1. In *French,* the principles of French Grammar, the translation of English into French, and three books of Voltaire's Charles XII or its equivalent; *or,*

2. In *German,* the whole of Whitney's German Grammar, translation of German at sight, the translation of English into German, and one hundred pages of Whitney's Reader, including two of the longer prose extracts or an equivalent; *or,*

3. In *Mathematics,* Solid Geometry and Conic Sections, as much as is contained in Newcomb's Elements of Geometry; Advanced Algebra, as much as is contained in Olney's University Algebra, or in Newcomb's Algebra; and Trigonometry, Plane and Spherical, as much as is contained in Wheeler's Elements of

Trigonometry, or in the unstarred portions of Oliver, Wait, and Jones's Treatise on Trigonometry.

To the Course in Natural History.

In addition to the Primary Examination, as follows:

1. In *French* or *German*, as above.
2. In *Plane Trigonometry*, as above.
3. In *Latin*, four books of Cæsar's Commentaries or some equivalent, with a good knowledge of the grammar.
4. In *Greek*, the alphabet and enough of the language to enable the student to recognize, analyze, and form scientific technical terms.

To the Two-Year Course Preparatory to the Study of Medicine.

In addition to the Primary Examination, as follows:

1. In *Plane Trigonometry*, as above.
2. In *Latin*, as above.
3. In *Greek*, as above.

To the Courses in Literature, Philosophy, and History and Political Science.

In addition to the Primary Examination, as follows:

1. In *French* or *German*, as above.
2. In *Mathematics*, as above.
3. In *Latin*, as below.
4. In *Grecian* and *Roman History*, as below.

To the Course in Arts.

In addition to the Primary Examination, as follows:

1. In *Greek*, candidates are expected to have read at least one hundred pages of Attic prose, and three books of Homer: they are examined (1) critically on what they have read; (2) in translating easy Greek at sight; (3) in translating English into Greek; and (4) on the History of Greece, to the death of Alexander.

2. In *Latin*, candidates are examined (1) in the following authors, with questions on subject-matter, constructions, and the formation and inflection of words: Cæsar, four books of the Gallic War, Virgil. the Eclogues and six books of the Æneid, with the prosody, Cicero, six Orations, including the four against Catiline; (2) in the translation at sight of passages of average difficulty from Cæsar and Cicero; (3) in the translation into Lat-

in of a piece of connected English based upon the principles and vocabulary contained in the first forty lessons of Allen's Introduction to Latin Composition; (4) on the outlines of Roman History and Ancient Geography (Leighton's History of Rome will indicate the amount and method of study desired); and (5) on the History of Greece, as above.

ADMISSION TO SPECIAL DEPARTMENTS.

Any person at least twenty-one years of age, and having satisfactory attainments, may be admitted without examination, by a vote of the Faculty, to any of the Departments in which either laboratory work or drafting is required, on the recommendation of the professor in charge of the department. Such special students are required to devote at least fifteen hours a week to the work of the department which they have entered, and to renew their application for admission at the end of each year.

ADMISSION TO ADVANCED STUDIES.

Candidates for admission to advanced studies in any course are required to pass, *in addition to the entrance examinations* for that course, examinations in the work already performed by the classes which they design to enter.

CANDIDATES FROM OTHER COLLEGES.

Certificates of honorable dismissal from other colleges are received in place of the *Primary Examination* only, and when offered by those who *have passed at least one term's examinations* at the institution granting such dismissal. No person, whether from another college or not, is admitted to *advanced* studies except after examination as above stated.

ADMISSION TO GRADUATE STUDY.

Students are admitted to graduate study after having taken a baccalaureate degree in this University, or on presenting the diploma of any equivalent degree conferred elsewhere; they are at liberty to attend lectures, recitations, or other exercises of undergraduates, and to use the library, museums, etc. They are expected to pursue some study of advanced character under the direction of a professor or a special faculty.

DEPARTMENTS AND SPECIAL COURSES OF STUDY.

AGRICULTURE.

I. APPLIED AGRICULTURE.

The requirements for admission to the courses in Agriculture are such as to put the advantages which they offer within the reach of every young man who has made good use of the instruction afforded in the public schools. The instruction is given by lectures and recitations, illustrated with the aid of the Auzoux models and various other collections belonging to the University. Besides the class-room exercises, the student devotes as much time as can be spared to practice in the botanical, chemical, and veterinary laboratories, as well as in the fields and barns.

In Applied Agriculture five hours weekly, during the fourth year, are devoted to technical instruction in all its leading and most of its minor branches. The student is also required to spend three hours a day, two days in each week, in field practice, and in the handling and feeding of domestic animals; and if this amount of practice does not prove sufficient to make him familiar with the various operations of the farm, additional time is required during the summer vacation.

The instruction by lectures begins with the fourth year, and continues through three terms.

First Term: Wheat—culture, varieties, preparation of the soil, seeding, injurious insects, harvesting, threshing, marketing; Swine—the history of breeds, feeding, general management, piggeries; Farm Buildings—location, plans, material, construction, repairs and preservation, contracts, liabilities of contractors; Fields—shape and size; Fences and Gates—construction, num-

ber, kind, repairs, durability of woods used; Farm and public roads, bridges and culverts—location, construction, repairs; Farms—selection and purchase with regard to remoteness or nearness to markets, agricultural capabilities, roads, improvements, schools and society; Titles, deeds, judgments, and mortgages; Farm-Yard Manures—composition, manufacture, preservation, application; Commercial Fertilizers—composition, application, utility.

Second Term: Farm Accounts; Principles of Stock-breeding—law of similarity, of variation as caused by food, habit and climate atavism, relative influence of male and female, prepotency, sex, in-and-in breeding, crossing and out-crossing, grading up or breeding in line; Races and Breeds,—pedigrees, leading breeds of neat animals treated as to history, markings, characteristics, and adaptation to uses, soil, climate, and locality; Breeding, feeding, and management of cattle; Butter, cheese, and milk dairies, and beef production; Sheep Husbandry treated in detail same as cattle.

Third Term: The Horse—breeds and breeding, education, care, driving, stables; Farm Drainage—mapping of drains, material construction, utility; Plows and plowing; Farm Implements and Machinery—use, care, and repairs; Corn, oat, barley, and flax culture; Grasses and forage plants; Weeds and their eradication; Business customs, rights, and privileges; Notes, contracts, and obligations; Employment and direction of laborers.

University Farm.

The Farm consists of 120 acres of arable land, the larger part of which is used for experimental purposes and the illustration of the principles of Agriculture. Nearly all the domestic animals are kept to serve the same ends. Those portions of farm and stock not used for experiments are managed with a view to their greatest productiveness. Statistics of both experiments and management are kept on such a system as to show at the close of each year the profit or loss not only of the whole farm but of each crop and group of animals. Of the two barns with which the farm is equipped, one is largely devoted to the needs of the Horticultural Department; the other, containing steam-engine, feed-cutter, stationary thresher, and other necessary ap-

pliances, furnishes accommodation for the general crops and stock, and for experimental work.

II. AGRICULTURAL CHEMISTRY.

The study of Agricultural Chemistry comprises lectures, and analytical practice in the laboratory. The lectures, seventy-five in number, embrace the following general subjects:

The general principles of chemical science, accompanied by introductory laboratory practice; the chemistry of the elements and their compounds that constitute soils, plants, and animals; agricultural chemical investigators and their methods and means of working, and the literature of agricultural chemistry; the chemistry of vegetable life, and the production of vegetable substance in general; the physical and chemical properties and agricultural resources of the soil; tillage, drainage, etc., and amendments and manures; the composition of crops and other materials used for fodder; animal chemistry and nutrition; fermentation and putrefaction; milk and its manufactured products and residues; food, water and air in their relations to human and animal life; the chemical analysis of fodder and food; farm crops and their manufactured products and residues.

The analysis of agricultural materials and products is treated in a course of chemical practice, as described under the head of Analytical Chemistry, page 55.

III. ECONOMIC ENTOMOLOGY.

Twenty lectures are given in the third term.

The course presents the characteristics of the orders of insects, the more important families, and the species which are injurious, beneficial, or otherwise especially interesting. The lectures are illustrated by specimens of the stages and works of insects, and due prominence is given to the practical treatment of forms having an economic importance.

In the laboratory and field practice, students are instructed in all kinds of practical entomological work, involving drawings and notes of observations, with methods of collecting, breeding, destroying, preserving, arranging, etc.

Entomological Cabinet and Laboratory.

The Entomological Cabinet contains, in addition to many ex-

otic insects, specimens of a large proportion of the more common species of the north-eastern United States. These specimens are arranged in two collections: one biological, containing specimens illustrative of the metamorphoses and habits of insects; the other systematic, in which the species are arranged so as to show their zoölogical affinities.

The Laboratory is equipped with a set of Auzoux models, microscopes, breeding cages, and other apparatus necessary for practical work in Entomology.

IV. HORTICULTURE.

The instruction comprises two courses of lectures during the first term, supplemented by experimental or practical work.

Third Year: A course of lectures upon arboriculture and landscape gardening.

Fourth Year: A course of lectures upon the principles of Horticulture.

Additional time is given to experimental work in the garden or conservatories. The instruction in botany, both in the laboratory and in the several courses of lectures, is intended to afford a scientific basis for the special instruction given in Horticulture.

V. VETERINARY SCIENCE.

The regular course for students in Agriculture, Natural History, etc., embraces: Five lectures a week during an entire academic year; laboratory work on the bones, clastic models, pathological preparations, and parasites of domestic animals; clinical instruction on cases occurring in practice.

First Term: Lectures on the anatomy and physiology of the animals of the farm. Attention is given to the principles of hygiene as affected by genus, breed, climate, soil, exposure, buildings, ventilation, drainage, food, and water; to the varying anatomical peculiarities which imply special aptitude for particular uses; to the data for determining age; to the principles of breeding, of shoeing, etc.

Second Term: Lectures on general comparative pathology; on specific fevers and other contagious diseases; on the parasites and parasitic diseases of domestic animals; and on constitutional diseases. An important feature in this course is the subject of veterinary sanitary science and police, embracing as it does the

prevention of animal plagues by legislative and individual action; the improvement of unhealthy localities; and the destruction of animal poisons and parasites which are intercommunicable between man and the domestic animals.

Third Term: Lectures on the local diseases of the various systems of organs in the different animals, and on veterinary surgery.

Opportunities are afforded to students who desire it to pursue the study of Veterinary Medicine and Surgery farther than is provided for in the regular courses of study.

Veterinary Museum.

The Museum embraces the following collections:

1. The Auzoux veterinary models, comprising clastic models of the horse, showing the relative position of over three thousand anatomical parts; models of limbs, sound and with detachable pieces and their morbid counterparts, illustrating changes in diseases of the bones, joints, muscles, etc.; a set of obstetrical models, showing the virgin and gravid uterus in different animals, and the peculiarities of the female pelvis and its joints; models of the gastric cavities of domestic animals; an extensive set of models of jaws, showing the indications of age as well as of vicious habits and diseases; models of equine teeth in sections, showing structure and the changes effected by wear.

2. Skeletons of the domestic animals, articulated and unarticulated.

3. A collection of diseased bones, illustrating the various constitutional diseases which impair the nutrition of these structures, together with the changes caused by accidental injuries and purely local disease.

4. Skulls of domestic animals, prepared to illustrate the surgical operations demanded in the different genera.

5. Jaws of farm animals, illustrating the growth and wear of the teeth, age, dentinal tumors, caries, etc.

6. A collection of specimens of teratology, consisting of monstrous foals, calves, and pigs.

7. A collection of tumors and morbid growths removed from the different domestic animals.

8. Some hundreds of specimens of parasites from domestic animals.

9. A collection of calculi from the digestive and urinary organs, etc., of farm animals.

10. Foreign bodies taken from various parts of the animal economy.

11. A collection of surgical instruments used in veterinary practice.

12. A collection of medicinal agents.

13. In addition, a large number of diagrams, the property of Professor Law, available in illustration of different points in anatomy, physiology, and pathology.

The Courses in Agriculture.

I. A FOUR-YEAR COURSE.

Leading to the Degree of Bachelor of Agriculture.

FIRST YEAR.

First Term.—French *or* German, 5; rhetoric, 2; geometry and conic sections, 5; freehand drawing, 3; hygiene, six lectures.

Second Term.—French *or* German, 5; rhetoric, 2; algebra, 5; freehand drawing, 3.

Third Term.—French *or* German, 5; rhetoric, 2; trigonometry, 5; general chemistry and laboratory work, lectures, 3.

SECOND YEAR.

First Term.—French *or* German, 3; agricultural chemistry, 5, zoölogy, lectures and laboratory work (vertebrates), 3; anatomy, laboratory work, 2. *Elective*, 3.

Second Term.—French *or* German, 3; agricultural chemistry, lectures, 4, chemistry, qualitative analysis, 5; anatomy, laboratory work, 2. *Elective*, 2.

Third Term.—French *or* German, 3; land surveying, 4; botany, lectures, 3, field-work, 2; entomology, lectures, 2, laboratory work, 2.

THIRD YEAR.

First Term.—Experimental mechanics and heat, 3; compositæ and gramineæ, 2; arboriculture and landscape gardening, 2; entomology, 3; veterinary anatomy and physiology, 5.

Second Term.—Electricity and magnetism, 3; chemistry, quantitative analysis, 4; vegetable physiology, 3; vegetable histology, 2; veterinary pathology, sanitary science and parasites, 5.

Third Term.—Acoustics and optics, 3; chemistry, quantitative analysis, 9; veterinary medicine and surgery, 5.

FOURTH YEAR.

First Term.—Agriculture, lectures, 5, field-work, 3; botany, (fungi), 4; horticulture, lectures, 2; geology, 3.

Second Term.—Agriculture, lectures, 5, field-work, 2; systematic and applied botany, 3. *Elective*, 5.

Third Term.—Agriculture, lectures, 3, field-work, 3· building materials and construction, 2; American law, 5.

II. A THREE-YEAR COURSE.

Not Leading to a Degree.

FIRST YEAR.

First Term.—Geometry and conic sections, 5; freehand drawing, 3; agricultural chemistry, lectures, 5, laboratory work, 3.

Second Term.—Algebra, 5; agricultural chemistry, lectures, 4, laboratory work, 6.

Third Term.—Trigonometry, 5; botany, lectures, 3, field-work, 2; entomology, lectures, 2, laboratory work, 2.

SECOND YEAR.

First Term.—Experimental mechanics and heat, 3; compositæ and gramineæ, 2; arboriculture and landscape gardening, 2; geology, 3; veterinary anatomy and physiology, 5.

Second Term.—Electricity and magnetism, 3; chemistry, laboratory work, 4; vegetable physiology, 3; vegetable histology, 2; veterinary pathology, sanitary science, and parasites, 5.

Third Term.—Acoustics and optics, 3; land surveying, 4; chemistry, laboratory work, 4; veterinary medicine and surgery, 5.

THIRD YEAR.

The same as the fourth year of the four-year course.

For the requirements for admission to these courses see page 28.

No lectures in Agriculture will be given during the second term of the academic year, 1882–3.

MECHANIC ARTS.

In 1870 Hon. Hiram Sibley, of Rochester, N. Y., provided for the erection of a suitable building for the Department of Mechanic Arts. He also gave ten thousand dollars for increasing its equipment of tools, machines, etc., and has since made a further gift of thirty thousand dollars for the endowment of the professorship of Practical Mechanics and Machine Construction Still later he provided the means for erecting and fitting up a brass and iron foundry, and a blacksmith shop.

Closely connected with the lecture-rooms are the rooms for freehand and mechanical drawing, the designing of machinery, and pattern-making, and the machine shop. The shop practice embraces work requiring the use of all hand-tools and the machines employed in the ordinary machine shops.

Each student in the department is required to devote two hours a day to work in the shop; but such students as have, before entering, acquired sufficient practical knowledge, are admitted to advanced standing. Attendance is required upon ten lectures or recitations a week, or their equivalent, in addition to two hours daily drawing, two hours daily shop-work, and the passing of the examinations at the close of each term.

Mechanical Laboratory.

The machine shop is used for the sole purpose of giving instruction in practical work. It is supplied with lathes of various kinds, planers, grinding machinery, drilling machines, shaping machines, a universal milling machine fitted for cutting plane, bevel, and spiral gears, spiral cutters, twist drills, with additional tools and attachments for graduating scales and circles, and for working various forms and shapes.

In addition to the hand and lathe tools of the usual kinds there are tools of the greatest accuracy, consisting of standard surface-plates, straight-edges, and squares of various sizes, a standard measuring machine, measuring from zero to twelve inches by the ten-thousandth of an inch, a universal grinding machine for producing true cylindrical and conical forms, and a set of Betts's standard gauges.

In the iron and brass foundry and the blacksmith shop, instruction is given in molding, casting, and forging. The cupola used

is one of Colliau's improved, with a capacity of melting one ton of iron per hour.

For the purpose of instruction in experimental work there is a twenty-ton Riehle testing machine, arranged for testing the strength of materials by tension, compression, and transverse strain; Richards's and Thompson's steam-engine indicators, and Amsler's planometer; Schaeffer & Budenberg's revolution counter, steam-gauges, injector, inspirator, pop-valve, steam pump; Baldwin's link and valve motion, experimental valve motion, together with a large collection of brass, iron, and wooden models illustrative of mechanical principles.

The course of instruction in mechanical drawing is progressive, from geometrical drawing to the designing of machines and the making of complete working drawings.

The appliances for instruction consist of several hundred drawings selected from those of technical schools abroad, and from representative American steam-engine makers and others; of photographs, models, and machines; and of apparatus used in copying by the "blue print process."

The Course in Mechanic Arts.

Leading to the Degree of Bachelor of Mechanical Engineering.

FIRST YEAR.

First Term.—German, 5; geometry and conic sections, 5; freehand drawing, 3; shop-work, 3.

Second Term.—German, 5; algebra, 5; freehand drawing, 3; shop-work, 3.

Third Term.—German, 5; trigonometry, 5; geometrical drawing, 3; shop-work, 3.

SECOND YEAR.

First Term.—German, 3; rhetoric, 2; analytical geometry, 5; experimental mechanics and heat, 3; shop-work, 3.

Second Term.—German, 3; rhetoric, 2; calculus, 5; electricity and magnetism, 3; shop-work, 3.

Third Term.—Calculus, 5; descriptive geometry, text and drawing, 4; mechanical drawing, 2; building materials, 3; shop-work, 3.

THIRD YEAR.

First Term.—Calculus and analytical geometry, 5; descriptive geometry, text and drawing, 6; mechanism, 3; shop-work, 3.

Second Term.—Mechanics of engineering, 5; mechanism, 3; physics, laboratory work, 3; chemistry, 3; shop-work, 3.

Third Term.—Mechanics of engineering, 5; mechanical drawing, with shades, tinting, and perspective, 3; physics, laboratory work, 3; chemistry, 3; shop-work, 3.

FOURTH YEAR.

First Term.—Mechanics of engineering, 5; mechanical and working drawings, 3; physics, laboratory work, 3; steam-engine, 3; shop-work, 3.

Second Term.—Mechanical drawing, 4; steam-engine, 3; metallurgy, 2; experimental work with indicators, governors, pumps, and injectors, 3; shop-work, 3.

Third Term.—Graphical statics, 3; field practice and the use of instruments, 3; industrial chemistry, 3; technical reading and preparation of thesis, 3; shop-work, 3.

GRADUATE COURSE.

First Term.—Machines for regulating, counting, etc., 3; mechanical *or* physical experiments, *or* chemistry, 3; riparian laws, contracts, patent office laws, etc., 2. *Elective*, 7.

Second Term.—Machines for change of form, 3; mechanical *or* physical experiments, *or* chemistry, 3; technical reading, 2. *Elective* 7.

Third Term.—Locomotive machines, hoists, cranes, etc., 3; mechanical *or* physical experiments, *or* chemistry, 3; shop systems and accounts, 2. *Elective*, 7.

The elective studies are hydraulics, assaying, mineralogy and blow-pipe analysis, chemical laboratory practice, physics (acoustics and optics), motors other than steam, architecture, civil engineering, shop-work, mathematics, botany, French, rhetoric, history, literature.

For the requirements for admission to this course see page 28.

MILITARY SCIENCE.

Pursuant to the act of Congress creating the land grant on which the Cornell University is founded, and the act of the legislature of the State of New York assigning that land grant, instruction is provided in Tactics and Military Science. Drill and Military Science are "a part of the studies and exercises in all courses of study and in the requirements of all students in the University" during the first and third terms of the first and second years and the second term of the fourth year. Foreigners, laboring students, and those physically unfitted therefor are excused from drill. Students are required to provide themselves with the University uniform, except such as may be excused on account of their inability to procure it, and they are held accountable for loss or injury to the arms and other public property issued to them.

The course extends through the first and third terms of the first two years, and the second term of the fourth year. During the first two years there are three exercises a week, of an hour each; those of the fourth year consist of a regular course of lectures on the general operations and science of war, twice a week.

Any student who has satisfactorily performed all the duties required for the first two years, and who is qualified therefor, may be selected for the place of a commissioned officer if needed. For the performance of his duties as a commissioned officer in the third or fourth year he is entitled to a credit of three recitations a week for each term; and, at graduation, he may receive a certificate of military proficiency with his diploma.

The practical military exercises include: *Infantry Tactics.*—To comprise the schools of the soldier, company, and battalion; with skirmishing, the forms of parade, and the duties of guards. *Artillery Practice.*—To comprise at least the school of the piece and section for the field guns, with such further artillery instruction as may be found practicable. *Special Exercises.*—To comprise recitations at such times as may be prescribed.

The advanced course of instruction in Military Science is optional, and is open to all undergraduates and to such special students as have sufficient scientific and practical preparation.

It requires an attendance upon a class exercise or lecture of

one hour on three days of the week during one year. The subjects are: *Military Engineering.*—To comprise the principles of military topography; the effect of projectiles; the principles of fortification, with their application to field works; military mining; the attack and defense of works; and the construction of military roads and bridges. *The Art of War.*—To comprise the history and principles of special tactics; the organization of armies, with some account of the administrative arrangements of our own army; strategy; grand tactics; and accessory operations of war. *Military Law.*— To comprise the origin, principles, and limitations of military law; the nature and force of the articles of war and the general regulations for the army; a summary of the rules of evidence; the constitution, jurisdiction, and procedure of courts-martial, courts of inquiry, military commissions, and military boards.

ARCHITECTURE.

The Course in Architecture is so arranged as to give the student instruction in all subjects which he should understand in order to enter upon the practice of the art.

The instruction is given by means of lectures and practical exercises. Its object is not merely to develop the artistic powers of the student, but to lay that foundation of knowledge without which there can be no true art. Drawing is taught during the first two years, and afterwards thoroughly used and applied in mechanics, stereotomy, and designing.

Architectural mechanics occupies a part of each term for one year. The lectures are each supplemented by at least two hours of work on problems. In developing the subjects and in solving problems, analytical methods are used, but for practical use special attention is paid to the application of graphical statics.

The study of the history of architecture and the development of the various styles runs through five terms. The lectures are illustrated by photographs, engravings, drawings, casts, and models.

Proper attention is paid to acoustics, ventilation, heating, decoration, contracts, and specifications. The whole ground of education in architecture, practical, scientific, historical, and æsthetic, is covered as completely as is practicable in a four-year course.

Equipment.

The White Architectural Library contains over one thousand volumes, and the photographic gallery nearly two thousand prints, all accessible to the student. Several hundred drawings, and about two hundred models in wood and stone have been prepared to illustrate the constructive forms and peculiarities of the different styles.

The Course in Architecture.

Leading to the Degree of Bachelor of Architecture.

FIRST YEAR.

FIRST TERM.—French *or* German, 5; rhetoric, 2; geometry and conic sections, 5; freehand drawing, 3; linear drawing, 1; hygiene, six lectures.

SECOND TERM.—French *or* German, 5; rhetoric, 2; algebra, 5; freehand drawing, 3; projection and tinting, 1.

THIRD TERM.—French *or* German, 5; trigonometry, 5; descriptive geometry, text and drawing, 4; botany, 3.

SECOND YEAR.

FIRST TERM.—French *or* German, 3; composition and elocution, 1; analytical geometry, 5; descriptive geometry, text and drawing, 6; experimental mechanics and heat, 3.

SECOND TERM.—French *or* German, 3; composition and elocution, 1; calculus, 5; drawing, 3; electricity and magnetism, 3; chemistry, lectures, 3.

THIRD TERM.—French *or* German, 3; composition and elocution, 1; drawing, 3; acoustics and optics, 3; chemistry, lectures, 3; building materials and construction, 3.

THIRD YEAR.

FIRST TERM.—Mechanics, strength of materials, 3; shades, shadows and perspective, 3; drawing, 3; Egyptian, Greek, and Roman architecture, 3; designing, 4.

SECOND TERM.—Mechanics, trusses, 3; Byzantine and Romanesque architecture, 5; designing, 3; construction, 2; lithology and determinative mineralogy, 2.

Third Term.—Mechanics, arches, 3; freehand drawing, 3; Gothic architecture, 5; designing, 3; construction, 2.

FOURTH YEAR.

First Term.—Renaissance architecture, 3; decoration, 3; designing, 6; stereotomy, 3.

Second Term.—Modern architecture, 3; designing, 4; stereotomy, applied to stone-cutting, 5; economic geology, 3.

Third Term.—Decoration, acoustics, ventilation, warming, professional practice, measuring, contracts, specifications, etc., 5; designing, 7.

For the requirements for admission to this course see page 28.

CIVIL ENGINEERING.

The instruction is given by means of lectures and recitations, with drafting, and field and laboratory practice. The field work embraces the usual operations and the more recent methods of land, railroad, and subterranean surveying, together with hydrography and geodetic practice; and since 1874 the department of Civil Engineering has been engaged in the surveys of the hydrographic basin of central New York, as a contribution to the geodetic surveys of the United States Government.

Laboratory practice is provided in chemistry, mineralogy, metallurgy, geology, physics, and civil engineering.

The students of this department receive instruction in an extended course of mechanics, as applied to engineering, and their professional preparation comprises the following subjects: The location and constructions of railroads, canals, and water-works; the construction of foundations, in water and on land, and of superstructures, and tunnels; the surveys, improvements, and defenses of coasts, harbors, rivers, and lakes; the determination of astronomical co-ordinates; the application of mechanics, graphical statics, and descriptive geometry to the constructions of the various kinds of right and oblique arch bridges, roofs, trusses, and suspension bridges; the design, construction and application of wind and hydraulic motors; air, electric, and heat engines, and pneumatic works; the drainage of towns and the reclaiming

of lands; the preparation of plans and specifications, and the proper selection and tests of the materials used in constructions. As a part of their instruction, students have frequent practice in the preparation of papers on subjects of professional importance.

An elementary course of lectures is given in engineering and mining economy, finance and jurisprudence.

To meet the growing demand for special training, the five-year course has been arranged, allowing considerable option and diversity of studies to students wishing to pursue special lines of study in bridge architecture, or in railroad, mining, topographical, sanitary, geographical, electrical, or industrial engineering.

The five-year course also offers lines of continuous study of a historical, literary, or scientific character, which may alternate with the prescribed studies, and with architecture, general science, and technology.

Equipment.

The special library of the department possesses many valuable works, among them the extensive publications recently presented to it by the French government; and in addition, the resources of the general library are available for the purposes of the department. The engineering laboratories contain various machines, models, and appliances for engineering investigations.

The engineering museums contain the following collections, which receive regular additions from a yearly appropriation:

1. The Muret collection of models in descriptive geometry and stone-cutting.

2. The De Lagrave general and special models in topography, geognosy, and engineering.

3. A nearly complete collection of the Schroeder models in descriptive geometry and stone-cutting, with some of the Olivier models, and others made at the University.

4. The Grund and Sohn collections of bridge and track details, roofs, and trusses, supplemented by similar models by Schroeder and other makers.

5. A complete railroad bridge of one-hundred-foot span, the model being one-fourth of the natural scale.

6. The Digeon collection of working models in hydraulic engineering.

7. Several collections of European photographs of engineering works during the process of construction; and many other photographs, diagrams, and models.

8. The following instruments of precision for astronomical purposes: a Troughton & Simms' transit, a universal instrument by the same makers reading to single seconds, three sextants, two astronomical clocks, chronographs, chronometers, two small equatorials, the larger of four and a half inch aperture, made by Alvan Clark, and other instruments necesssary to the equipment of a training observatory.

9. For geodetic work, a secondary base-line apparatus, made under the direction of the Geodetic and Coast Survey Office, and all the portable astronomical and field instruments needed, including sounding machines, deep-water thermometers, heliotropes, etc.

10. Among the coarser field instruments there is nearly every variety of engineers' transits, theodolites, levels and compasses; such modern instruments as omnimeters, tacheometers, and tachometers, with a large number of special instruments, such as planimeters, pantographs, elliptographs, arithmometers, pocket altazimuths and sextants, hypsometers, and meteorological instruments of all descriptions.

The Courses in Civil Engineering.

I. A FOUR-YEAR COURSE.

Leading to the Degree of Bachelor of Civil Engineering.

FIRST YEAR.

First Term.—French *or* German, 5; rhetoric, 2; geometry and conic sections, 5; freehand drawing, 3; hygiene, six lectures.

Second Term.—French *or* German, 5; rhetoric, 2; algebra, 5 freehand drawing, 3; linear drawing, 2.

Third Term.—French *or* German, 5; trigonometry, 5; descriptive geometry, text and drawing, 4; botany, 3.

SECOND YEAR.

First Term.—French *or* German, 3; analytical geometry, 5 descriptive geometry, text and drawing, 6; experimental mechanics and heat, 3.

Second Term.—French *or* German, 3; calculus, 5; pen topography, 2; tinting and shading, 2; electricity and magnetism, 3; chemistry, 2.

Third Term.—Calculus, 5; land surveying, 4; acoustics and optics, 3; chemistry, 3; technical essays, 1.

THIRD YEAR.

First Term.—Calculus, 5; shades, shadows and perspective, 3; topographical mapping and sketching, 2; lettering, 1; kinematics, *or* physics, laboratory work, 3; technical essays, 1.

Second Term.—Mechanics of engineering, 5; detail drawing and graining, 2; physics, laboratory work, 3; mineralogy *or* metallurgy, 2; geology, 3.

Third Term.—Mechanics of engineering, 5; railroad surveying, 5; colored topography, 3; lettering, 2.

FOURTH YEAR.

First Term.—Mechanics of engineering, 5; spherical astronomy, 5; practical astronomy, night observations, 2; Egyptian, Greek and Roman architecture, *or* physics, laboratory work, 3; stereotomy and original problems, 3; civil engineering, 2; technical essays, 1.

Second Term.—Hydraulics, 5; higher geodesy, 5; mineralogy *or* metallurgy, 2; stone-cutting and original problems and practice, 5.

Third Term.—Hydraulic motors, 2; civil engineering, 3; engineering economy, 2; bridge stresses, 5; hydrographic surveying, chart-making, and geodesy, field-work, 3; preparation of thesis.

Students in the courses in civil engineering are required to write memoirs upon professional subjects of their own selection before the close of the spring term, and these memoirs are presented on the first Friday of the following term. The memoir of the last two years must contain original investigations.

On the satisfactory completion of the above four-year course, students take the degree of Bachelor of Civil Engineering, and become entitled to all the privileges of resident graduates.

II. A FIVE-YEAR COURSE.

Leading to the Degree of Civil Engineer.

The first four years are the same as in the four-year course. The choice of electives in the fifth year is subject to the approval of the dean of the department.

Students in the fifth year pay no tuition fees and have all the privileges of resident graduates.

FIFTH YEAR.

FIRST TERM.—Riparian rights and law of contracts, 3; bridge construction and details, 3; projects, designs, and specifications, 3.

Elective, 9: Greek history, 2; modern history, 3; psychology, 2; American history, 2 or 3; physiology and zoölogy, 5; languages, 2; technical reading, 2; renaissance architecture, 3; chemistry, laboratory work, 3; engineering, laboratory work, 3; physics, laboratory work, 3; rock drills and air compressors, 3; the steam-engine, 3; mining projects, 3; geology, 3; industrial chemistry, 3; mathematics, 3.

SECOND TERM.—River and harbor improvements, 3; advanced astronomy and geodesy, 3; technical reading, 2; projects, designs, and specifications, 2.

Elective, 8: Roman history, 2; American history, 2 or 3; political economy, 2; languages, 2; pure or applied mathematics, 5; zoölogy, 3; metallurgy *or* mineralogy, 3; chemistry, laboratory work, 3; engineering, laboratory work, 3; physics, laboratory work, 3; Romanesque architecture, 3; the steam-engine, 3; mining projects, 2; industrial chemistry, 3; geology, 3.

THIRD TERM.—Sanitary engineering, 3; locomotive machines, etc., 3; projects, designs, and specifications, 2.

Elective, 6: Roman history, 2; modern history, 3; American history, 2 or 3; languages, 3; pure or applied mathematics, 4; historical or technical reading, 3; geology, 3; chemistry, laboratory work, 3; engineering, laboratory work, 3; physics, laboratory work, 3; Gothic architecture, 3; pumps and small machinery, 2; industrial chemistry, 3; mining projects, 4; arch ribs, 3; geodesy, field-work.

For the requirements for admission to these courses see page 28.

MINING ENGINEERING.

Although no department of Mining Engineering has yet been formally established, all the main instruction required by a mining engineer is now given, as follows: The professor of civil engineering and his associates pay special attention to the needs of those intending to connect themselves with the mining industries, giving lectures on tunneling and on the theory and practice of such constructions as are common to the professions of the civil and mining engineer; the professor of mechanical engineering and his associates pursue a like course, giving instruction in mining machinery; the professors of general chemistry and mineralogy, of analytical chemistry, and of industrial chemistry, give instruction in metallurgy, assaying, chemical analysis, and cognate subjects; the professors of geology and palæontology give instruction in the theory and classification of ores, and in those branches relating to chemical geology.

It is intended, at an early day, to supplement the existing force by the appointment of such additional professors and lecturers as are necessary to the establishment of a mining school for the most advanced work, both as regards theory and practice. As it is, the University, by its existing provision in the departments named above, is enabled to give such instruction that a student graduating in them can, in a very short time, make himself acquainted with the practical processes; and, in all probability, by the time any student now entering the existing departments shall be sufficiently advanced to need instruction in the more elaborate special processes connected with mining, provision will have been fully made to give it.

FREEHAND DRAWING.

Instruction in Freehand Drawing is given by means of lectures and general exercises from the black-board, from flat copies, and from models. The work embraces a thorough training of the hand and eye in outline drawing, elementary perspective, model and object drawing, drawing from casts, and sketching from nature.

The effort is, not to make mere copyists, but to render the student familiar with the fundamental principles underlying this

art, and to enable him to represent any object he may desire correctly and rapidly. The course is largely industrial, and the exercises are arranged, as far as possible, with special reference to the drawing required in the work of the different departments.

All students in the departments of Agriculture, Architecture, Civil Engineering, Mechanic Arts, Mathematics, and Natural History devote two hours a day to freehand drawing during the first two terms of the first year; and students in Architecture, in addition, two hours a day during one term of the second, and one term of the third year. Students in the other courses may take drawing as an elective study.

Equipment.

The department has a large collection of studies of natural and conventional forms, both shaded and in outline; of geometrical models, and of papier mache and plaster casts, including a number of antique busts, casts of parts of the human figure, studies from nature, and examples of historical ornament.

MATHEMATICS AND ASTRONOMY.

The instruction offered by this department is designed to meet the wants of all classes of students. Undergraduates in all the regular courses except Natural History have the Mathematics of the first year, namely, geometry, algebra, and trigonometry; those in Mechanic Arts, Architecture, and Civil Engineering have two or four terms of analytical geometry and calculus; those in most of the general scientific courses have analytical geometry and astronomy; and all students have the privilege of electing these and the higher branches. The full course given below is designed for those intending to teach Mathematics in academies and colleges, or to use it as an instrument of investigation.

According to the subject taught, there are one, two, three, or five exercises a week, consisting of lectures and recitations, with the solution of problems or with other written exercises; and much of the later work is from French or German text-books.

In all the classes frequent reviews and examinations are held during the term, besides the regular examination at its close

These preliminary examinations cover previous as well as current work, and test the student's command of general principles and methods as well as of details. They are given without notice.

The Course in Mathematics.

Leading to the Degree of Bachelor of Science.

FIRST YEAR.

FIRST TERM.—French, 5, and German, 3, *or* German, 5, and French, 3; rhetoric, 2; geometry and conic sections, 5; hygiene, six lectures.

SECOND TERM.—French, 5, and German, 3, *or* German, 5, and French, 3; rhetoric, 2; algebra, 5; linear drawing, 2.

THIRD TERM.—French, 5, and German, 3, *or* German, 5, and French, 3; rhetoric, 2; trigonometry, 5.

SECOND YEAR.

FIRST TERM.—Analytical geometry, 5; mathematical essays, 1; freehand drawing, 3; experimental mechanics and heat, 3; physiology, 3; composition and elocution, 1.

SECOND TERM.—Calculus, 5; mathematical essays, 1; freehand drawing, 3; electricity and magnetism, 3; chemistry, 3; composition and elocution, 1.

THIRD TERM.—Calculus, 5; mathematical essays, 1; descriptive geometry, text and drawing, 4; acoustics and optics, 3; chemistry, 3; composition and elocution, 1.

THIRD YEAR.

FIRST TERM.—Calculus and analytical geometry, 5; determinants, 2; descriptive geometry, text and drawing, 6; physics, laboratory work, 3; essays, 1.

SECOND TERM.—Differential equations, 5; projective geometry, 3; descriptive astronomy, 3; mathematical essays, 1; physics, laboratory work, 3; essays and orations, 1.

THIRD TERM.—Differential equations and finite differences, 5; physical astronomy, 3; mathematical essays, 1; physics, laboratory work, 3; botany, 3; essays and orations, 1.

FOURTH YEAR.

First Term.—Imaginaries and elliptic functions, 3; mécanique analytique, 2; mathematical essays, 1; shades, shadows, and perspective, 3; geology, 1; modern history, 3; English literature, 2.

Second Term.—Imaginaries and elliptic functions, 3; mécanique analytique, 2; quaternions, *or* modern methods in analytical geometry, *or* applied mathematics, 5; mathematical essays, 1; philosophy of history, 3; English literature, 2.

Third Term.—Imaginaries and elliptic functions, 3; mécanique analytique, 2; quaternions, *or* modern methods in analytical geometry, *or* applied mathematics, 3; mathematical essays, 1; logic, 3; Constitution of the United States, twelve lectures; English literature, 2.

For most of the studies not closely connected with Mathematics substitutes are allowed.

To graduates and special students, instruction is offered in theory of numbers, quantics, and celestial mechanics.

For the requirements for admission to this course see page 28.

PHYSICS.

The instruction comprises a general course of lectures designed as an introduction to the study of the subject, an elementary laboratory course designed to give a general knowledge of the science, and an advanced laboratory course.

The general course occupies one year, the exercises consisting of two experimental lectures and one recitation weekly. The subjects are pursued as follows: first term, experimental mechanics and heat; second term, electricity and magnetism; third term, acoustics and optics. A knowledge of mathematics through plane trigonometry is required for registration in either of the subjects; and for registration in electricity and magnetism and in acoustics and optics, a knowledge of experimental mechanics and heat is also required.

This course is required of all regular students with the following exceptions: candidates for the degree of Mechanical Engin-

-eer need not take the acoustics and optics; and candidates for the degree of Bachelor of Arts or Bachelor of Literature need take no physics.

The elementary laboratory course consists of a series of simple experiments arranged to perfect and fix the student's knowledge of physical facts and laws, and at the same time give him some experience in physical manipulation. The course occupies seven and one-half hours a week (equivalent to three hours of lectures) for one year. Considering the very elementary character of the general course, this is the minimum time that can be devoted to the work with profit to the student. This elementary laboratory course is required of all regular students in the courses in Mechanic Arts, Chemistry and Physics, Science, and Mathematics, and parts of it are required in the courses in Civil Engineering and Natural History.

Students are admitted to the laboratory to pursue only such subjects as they have completed in the general course of lectures.

The advanced laboratory course consists of a series of experiments for the establishment of physical laws and the determination of constants. Many of these experiments involve the most refined methods of measurement. Students entering this course are expected to devote to it at least seven and a half hours a week. They may enter for one or more terms at their option, and may, within certain limits, elect the line of work they wish to pursue. Special students will devote a part of their time to an original investigation.

The elementary laboratory course described above is required for admission to the advanced course. A knowledge of analytical geometry and calculus will also be found very useful.

Apparatus.

Upon the completion of the new building now in progress, ample rooms expressly designed for laboratory work will be available. The collection of apparatus has been increased by the expenditure during the past year of about fifteen thousand dollars. The collection includes a fine gravity escapement clock, a chronograph for measuring tenths of seconds, and another for measuring short intervals of time to the ten-thousandth of a

second, two cathetometers, a dividing engine, a large spectrometer reading to seconds, a set of apparatus for electrical measurements, besides a large collection of illustrative apparatus.

CHEMISTRY AND MINERALOGY.

I. DESCRIPTIVE AND THEORETICAL CHEMISTRY.

The instruction begins with lectures on inorganic chemistry in the second term of the second year, and continues through two terms. Three lectures a week are given on the theoretical principles and the general study of the chemistry of inorganic bodies. During the first term of the third year, a course of lectures is given on the chemistry of organic bodies. In addition to the final examination at the end of the term, occasional examinations are held during the term, of which no previous notice is given, the students being expected to hold themselves in readiness for such an examination at all times.

For laboratory instruction in this branch of the subject a course of introductory practice is given in the third term of the second year. This course is required of students in the course in Science, and of students in the courses in Chemistry and Physics, and in Agriculture; it is required, further, of all students in other courses who take chemical practice as an optional study, in the beginning of their practice, except those who can give only the minimum amount of time (seven and a half hours a week) for two or three terms, and who for sufficient reasons desire to devote all that time to chemical analysis. This introductory practice consists in the performance by the student of a series of experiments illustrating the more important general principles of the science. The details of the manipulation of each experiment are carefully described, but the results to be obtained are not given. For the better cultivation of the student's powers of observation he is required to observe and describe these results for himself, and trace their connection with the principles which they are intended to illustrate.

The instruction in theoretical chemistry is continued in the course in Chemistry and Physics by recitations in chemical philosophy, and by lectures on organic chemistry.

Metallurgy and Mineralogy.— During the second term two lectures a week are devoted to each of these subjects in alternate years. The course in Metallurgy is intended to give the students in the technical courses a general idea of fuels, ores, and the most important methods of extracting the various metals which are especially used in construction, the metallurgy of iron claiming naturally the most attention. A certain amount of laboratory work in blowpipe analysis, with practice in the identification of crystalline forms, is required in connection with the lectures on mineralogy.

II. AGRICULTURAL AND ANALYTICAL CHEMISTRY.

The general subject of Agricultural Chemistry is treated in a series of about sevent -five lectures, for an account of which see page 33.

The course in analytical chemistry, beginning in the second year, comprises qualitative and quantitative analysis both in the wet way and in the dry way (blowpipe analysis and assaying), and is adapted in respect to length and completeness to the special course of study the student is pursuing.

In the course in Chemistry and Physics, leading to the degree of B. S., the qualitative analysis in the wet way and the blowpipe analysis are taken in the first two terms, beginning with the second term of the second year; this work may or may not, according to the proficiency attained in these two terms, extend into the following term. In connection with the quantitative work, which occupies at least a large part of the time devoted to chemical practice in the third and fourth years of this course, some practice in qualitative analysis is continued.

The quantitative work begins with general practice in the determination of bases and acids by gravimetric and volumetric methods, after which follow the analysis of minerals, ores and technical products in the wet way, and dry assaying, organic ultimate and proximate analysis, the analysis of gaseous mixtures, the chemical examination of waters and articles of food, spectroscopic analysis, the preparation of substances, and, finally, the thesis for graduation, to which most of the time of the last two terms of the course should be devoted.

In the course in Agriculture, the analytical practice of ag-

ricultural chemistry begins in the first term of the second year, and comprises analysis in the wet way only; it is confined to those substances that may occur in agricultural materials and products. The qualitative analysis should be completed in two terms of this year, so that all the time given to the subject in the third year may be devoted to quantitative analysis. This quantitative work begins, as in the course in Chemistry and Physics, with general practice in the determination of bases and acids by gravimetric and volumetric methods. The chemical examination of fertilizers, soils, and agricultural products occupies the remainder of the course.

In the course in Civil Engineering a course of practice in blowpipe analysis is provided, which is intended to give to engineers such facility in the use of the blowpipe in determinative mineralogy as will enable them to avail themselves of this useful instrument in their field work, for the determination of the character of rocks and minerals.

In the Medical Preparatory Course, a short course of qualitative and quantitative analysis in the wet way is given, which may carry the student far enough to qualify him to examine animal liquids by chemical methods for assistance in the diagnosis of disease. The amount of practice necessary for acquiring merely the rudiments of chemical analysis renders it impracticable to accomplish more than this in the time allotted in the course. Students intending to study medicine who have more time for chemical practice can take a longer and more thorough course, which includes a better foundation in quantitative work, and a wider application of the proficiency thus gained to the chemical examination of animal substances and articles of food and drink, and to medical jurisprudence.

III. INDUSTRIAL CHEMISTRY.

A course of lectures is given in the third term of each year, and the subject is begun anew every second year.

The lectures relate to the applications of chemistry in the manufacturing industries and in daily life, and include among others the following subjects: acids and heavy chemicals, soaps, oils, coal gas, coal tar and its derivatives, glass, pottery, mortar and cement, leather, paper, paints, dyes and dyeing, alcoholic liquors, food, water, and air.

The treatment of these subjects embraces the consideration of the chemical nature of raw materials and the changes which they undergo in the course of manufacturing processes, the apparatus used and its resistance to chemical agents, the utilization or economical disposition of wastes, and the perfection and purity of finished products. The subjects of food, water, and air are also considered from a chemical standpoint with reference to their sanitary and industrial relations.

In connection with these lectures a course of laboratory work is provided, which bears upon the industrial applications of chemistry; and special courses are laid out for students with reference to the needs of any branch of industry they may select. This work consists of analyses of raw materials and commercial products, determinations necessary to the chemical control of a technical process in its different stages, and, when the student is sufficiently prepared, of original investigation with a view to the improvement of some industrial method.

Practical illustration of the different subjects treated is furnished not only in the collections belonging to the department, but also by means of excursions to mills and manufactories.

Chemical Laboratory.

A new building for the department of Chemistry and Physics has recently been begun, and will be ready for occupation about January, 1883. This building will contain all the necessary space for a museum, a library, laboratories, lecture-rooms, and other rooms, and will be thoroughly equipped with the most recent and approved appliances for the proper prosecution of the work of the department.

The chemical laboratory now in use contains, besides two lecture-rooms and the private laboratories of the professors, laboratories for students, with accommodations for two hundred. It is provided with gas and a full supply of apparatus for wet analysis, dry assaying, blowpipe, spectroscopic, and all other branches of chemical analysis. Its reading-room contains the best English, French, and German works of reference, and the current numbers of the chemical journals.

The Course in Chemistry and Physics.

Leading to the Degree of Bachelor of Science.

FIRST YEAR.

FIRST TERM.—French, 5, and German, 3, *or* German, 5, and French, 3; rhetoric, 2; geometry and conic sections, 5; hygiene, six lectures.

SECOND TERM.—French, 5, and German, 3, *or* German, 5, and French, 3; rhetoric, 2; algebra, 5.

THIRD TERM.—French, 5, and German, 3, *or* German, 5, and French, 3; rhetoric, 2; trigonometry, 5.

SECOND YEAR.

FIRST TERM.—French *or* German, 3; composition and elocution, 1; analytical geometry, 5; experimental mechanics and heat, 3; chemistry, laboratory work, 3.

SECOND TERM.—French *or* German, 3; electricity and magnetism, 3; chemistry, lectures, 3, laboratory work, 8.

THIRD TERM.—French *or* German, 3; acoustics and optics, 3; chemistry, lectures, 3, laboratory work, 5; botany, 3.

THIRD YEAR.

FIRST TERM.—Physics, laboratory work, 3; chemical philosophy, 3; chemistry, laboratory work, 7; geology, 3.

SECOND TERM.—Physics, laboratory work, 3; chemical philosophy, 3; organic chemistry, 1; chemistry, laboratory work, 5; mineralogy *or* metallurgy, 2; economic geology, 3.

THIRD TERM.—Physics, laboratory work, 3; chemical philosophy, 3; industrial chemistry, 2; chemistry, laboratory work, 7.

FOURTH YEAR.

FIRST TERM.—Physics, laboratory work, 4; organic chemistry, 1; chemistry, laboratory work, 8; history of philosophy, 3.

SECOND TERM.—Physics, laboratory work, 4; organic chemistry, 2; chemistry, laboratory work, 8; metallurgy *or* mineralogy, 2.

THIRD TERM.—Industrial chemistry, 2; chemistry, processes, 2, laboratory work, 8; organic chemistry, 1.

For the requirements for admission to this course see page 28.

NATURAL HISTORY.

I. BOTANY.

A course of lectures is given upon each of the following subjects: physiological Botany, gramineæ and compositæ, vegetable physiology, vegetable histology, systematic and applied Botany, higher cryptogamia, fungi, and algæ. Most of these courses of lectures are given in connection with laboratory work, which is further supplemented, whenever desirable, by field work or class excursions.

The foregoing courses of instruction occupy five hours a week for six terms, or two years. Their arrangement as regards the collegiate terms and years is seen in the tabulated statement of the course in Natural History.

The instruction in the various branches of Botany does not lose sight of the practical bearings of the science. Thus, in the work upon fungi a careful study is made of those forms which are destructive to cultivated plants; and in Systematic Botany, besides a study of the principles of classification and the special characteristics of the more prominent natural orders, some account is given of the history, uses, and importance of the chief economic species included in those orders.

The full course in Botany as laid down is not intended to be absolutely rigid, and students whose standing will warrant it may shape their studies by their taste, or by the ultimate object they have in view. To those who have completed a large share of the regular course, opportunities for advanced work are afforded consisting mainly of original investigations in some special branch of botanical science.

Herbarium and Apparatus.

The means of illustrating the instruction in Botany include the Herbarium, estimated to contain above twenty thousand specimens; two series of models, the Auzoux and the Brendel; two sets of maps, one by Achille Comte, the other by Professor Henslow; a lime lantern with five hundred views, illustrating different departments of Botany, but especially phytography; ten compound microscopes and several dissecting microscopes; a collection of fruits, barks, cones, nuts, seeds, fibers, and various dry and alcoholic specimens; a general collection of economic

vegetable products, and above a thousand specimens of the woods of different countries. Besides these, the large conservatories and gardens, and an uncommonly rich native flora afford abundant material for illustration and practical work.

II. GEOLOGY AND LITHOLOGY.

Instruction is given in general and economic Geology and Lithology by means of lectures, laboratory practice, and field-work. The lectures consist of a course on general Geology in the first term, a course on economic Geology in the second term; and, in the third term, a course on physical geography, designed to show the action of geological agencies in fitting the earth for human habitation.

The laboratory work consists of a progressive series of exercises in determinative mineralogy and lithology; and of exercises in the preparation of geological sections and maps from the data furnished by government reports. During the first and third terms there are frequent excursions and lessons in field work.

To advanced students, opportunities are offered for the microscopic investigation of minerals and rocks, and for the extended study of important mineral districts, with the preparation of reports thereon and discussions of the metallurgical methods and appliances adapted to their products. The rocks of Ithaca and its neighborhood afford ample material for study and original research.

III. PALÆONTOLOGY.

Instruction is given as follows: by laboratory work throughout the year; by excursions during the first and third terms to the rich fossiliferous localities in and about Ithaca; and by lectures on Systematic Palæontology in the second term.

The elementary work comprises the observation and recording of facts, the collecting of material in the field, the critical study of the literature and the classification in the laboratory of invertebrate fossils from all parts of the world.

Exceptional facilities are offered for advanced work in the interpretation of fossil forms as marks of geological age and sequence; in the study of faunas, their conditions and distribution; and in the critical study of species and genera, their char-

acters, relations, and modifications, as exhibited in the faunas and floras of the past.

It is expected that a party of students will be organized for exploration and collecting in some interesting locality during the coming summer vacation.

Laboratory.

The laboratory is furnished with the appliances needful for successful study, and these appliances have been greatly increased during the past year.

Among other things, it has numerous maps, wall tablets, engravings of geological objects, and magic-lantern slides.

Large and important additions have also been made to the lithological collections.

Museum of Palæontology.

The museum comprises the following collections:

1. The Jewett Collection, accumulated by the late Col. Jewett when curator of the State Cabinet of Natural History. This collection is especially rich in New York fossils, containing many of the original specimens described in the State reports, and not a few unique specimens.

2. A fair representation of the rich faunas of the cretaceous and tertiary formations along the eastern and southern part of the Union, and a large number of characteristic English and European fossils.

3. A fine series of English mesozoic fossils; of tertiary fossils from Santo Domingo; of pre-glacial fossils from Sweden; and numerous smaller collections from various typical localities in our own country.

4. The Ward series of casts.

5. The unique collections from Brazil, made by Prof. Hartt and party on the Morgan expedition, containing the original specimens; and a great number of duplicates.

IV. ZOÖLOGY.

The title includes human physiology and hygiene, and comparative anatomy. The instruction comprises lectures, demonstrations, laboratory and field work, as follows:

1. *Hygiene.*—Early in the first term are given six lectures upon the personal care of health, and upon emergencies. Among other practical matters, students are shown how to check bleeding, and how to practice the best methods for resuscitating the drowned.

2. *Human Physiology.*—The thirty-six lectures treat chiefly of the subjects not included in the entrance examination, the phenomena of nervous and muscular action, the vaso-motor system, and the structure and functions of the brain. They are illustrated by a life-sized manikin and other models, by numerous anatomical preparations, by diagrams and by painless experiments upon the frog and cat. Each student also examines, through the microscope, about thirty preparations of the tissues, including the living amœba, cilia in action, and the circulation in the frog's foot and menobranchus's gill.

3. *General Zoölogy.*—At one-third of the sixty-six exercises the students examine and dissect representative forms, including amphioxus, lamprey, shark, perch, menobranchus, frog, turtle, squid, crayfish, insect, clam, bryozoön, ascidian, starfish, etc. The lectures are illustrated by a full set of Auzoux models, by diagrams, and by the free use of the zoölogical collections.

4. *Comparative Anatomy.*—A course of twenty lectures is devoted either to the brain or to some special group of vertebrates. In either case, practical work is done both in dissecting and in the examination of the literature of the subject.

5. *Anatomical, Microscopical and Experimental Technology.*—The forty lectures upon these subjects are accompanied by practical demonstrations of all the methods presented, and these methods are employed by the students in the laboratory.

Laboratory Practice.—The laboratory practice varies with the needs of the student and the extent of his preparation. Usually, as a basis for other work, the skeletons of man and the domestic cat are studied, and some of the bones drawn and described by the student. He then dissects some of the muscles, vessels, and nerves. In the second term, the methods of microscopic manipulation are learned, and the tissues of the cat, frog, and menobranchus are examined. In the third term the student examines the brain, heart, and other viscera of the cat, and performs for himself the simpler physiological experiments. Ordi-

narily this work can be commenced only at the beginning of the year, and the student must have had instruction in drawing.

After the first year the student, according to his purposes, dissects other vertebrate animals or human subjects, or insects and other invertebrates. There are special facilities for the study of the vertebrate brain.

FIELD WORK.—During the first and third terms students are occasionally accompanied by their instructors to the field or lake in order to observe living animals, and learn the methods of their capture and preservation.

Zoological Collections.

1. *Vertebrates.*—There are about three thousand examples of about two thousand species of entire animals in alcohol. Half of the specimens are fishes collected in Brazil by the late Prof. C. F. Hartt; the remainder include series of named fishes from the Smithsonian Institution and the Museum of Comparative Zoölogy, representatives of the general North American fauna and of the local fauna, and rare specimens from various parts of the world. Among the last are the following: Orang, pangolin, sloths, ant-eaters, armadillos, jacana, sphenodon, monitor, crocodile, alligator, draco volans, axolotl, siren, amphiuma, pipa, ceratodus, polypterus, calamoichthys, chimæra, myxine, bdellostoma, and amphioxus.

More than two thousand anatomical preparations, about one-half of which are skulls and skeletons; the remainder brains, hearts, embryos, and other soft parts. Among them are more than two hundred and twenty preparations of the cat's brain, a large series of preparations of the lamprey and menobranchus, and embryos or young of opossum, kangaroo, manatee, dugong, peccary, lama, sea-lion, bat, alligator, menobranchus, amia, lepidosteus, shark, and skate.

About four hundred microscopical preparations, chiefly from the cat, frog, and menobranchus.

More than one thousand mounted skins of birds, most of which were presented by the late Green Smith, Esq.

2. *Invertebrates.*—The general invertebrate collection comprises a small but well selected series of forms representing all of the larger groups.

3. *Shells.*—The Newcomb collection of shells embraces more than eighty thousand examples of more than twenty thousand varieties, representing at least fifteen thousand species.

4. *Insects.*—The biological and systematic collections of insects described elsewhere.

The Course in Natural History.

Leading to the Degree of Bachelor of Science.

FIRST YEAR.

FIRST TERM.—French, 5, and German, 3, *or* German, 5, and French, 3; rhetoric, 2; freehand drawing, 5; hygiene, six lectures.

SECOND TERM.—French, 5, and German, 3, *or* German, 5, and French, 3; rhetoric, 2; chemistry, lectures, 3, laboratory work, 3.

THIRD TERM.—French, 5, and German, 3, *or* German, 5, and French, 3; rhetoric, 2; chemistry, lectures, 3, laboratory work, 3.

SECOND YEAR.

FIRST TERM.—French *or* German, 3; composition and elocution, 1; organic chemistry, lectures, 2; human physiology, 3; zoölogy, lectures and laboratory work (vertebrates), 3; anatomy, laboratory work, 2; anatomical technology, 1.

SECOND TERM.—French *or* German, 3; composition and elocution, 1; zoölogy, lectures and laboratory work (invertebrates), 3; laboratory work in physiological anatomy and histology, 5; microscopical technology, 1; blow-pipe determination of minerals, 3.

THIRD TERM.—French *or* German, 3; composition and elocution, 1; botany, lectures, 3, field work, 2; comparative anatomy of the brain, lectures, 2, laboratory work, 3; museum methods and experimental technology, 1.

THIRD YEAR.

FIRST TERM.—Experimental mechanics and heat, 3; higher cryptogamia, lectures and laboratory work, 2; compositæ and gramineæ, 2; geology, 3; psychology, 2; essays, 1; English literature, 3.

SECOND TERM.—Electricity and magnetism, 3; vegetable physiology, *or* systematic and applied botany, 3; vegetable histology, 2; economic geology, 3; palæontology, lectures, 2, laboratory work, 1; essays and orations, 1.

THIRD TERM.—Acoustics and optics, 3; algæ, lectures and laboratory work, 2; palæontology, laboratory and field work, 3; geology, laboratory work, 3; entomology, lectures, 2, laboratory and field work, 3.

FOURTH YEAR.

FIRST TERM.—Fungi, 4; the anatomy, physiology, and hygiene of domestic animals, lectures, 5; palæontology *or* geology, laboratory and field work, 3; history of philosophy, 3.

SECOND TERM.—Descriptive astronomy, 3; physics *or* natural history, laboratory work, 2; systematic and applied botany *or* vegetable physiology, lectures, 3; geology *or* palæontology, laboratory work, 2; advanced work in natural history *or* veterinary science, 5.

THIRD TERM.—Physical astronomy, 3; physics *or* natural history, laboratory work, 2; advanced work in natural history *or* veterinary science, 8.

V. PRELIMINARY MEDICAL EDUCATION.

There is no medical department of the University, but special facilities are provided for those who wish their course to be of direct use in the study of medicine.

The Faculty believe that the crowded and difficult curriculum of the medical schools should be preceded, when possible, both by a broad general education, and by a special and practical training in certain branches. They therefore strongly advise those who intend to become physicians to pursue some one of the full courses, and then to become resident graduates, reviewing physiology and chemistry, attending the lectures in veterinary science, and taking laboratory work in chemistry and anatomy.

When only four years are available, the courses in Natural History, Science, and Science and Letters afford more or less time for laboratory work, especially in the fourth year.

In case the student can remain but two years, he is advised to take the two-year Course Preparatory to the Study of Medicine,

which embraces the branches best calculated to serve as the basis of a proper medical course.

Finally, special students are received for a shorter period than two years, provided they are fitted to undertake the lectures and laboratory work.

A Two-Year Course Preparatory to the Study of Medicine.

Not Leading to a Degree.

FIRST YEAR.

FIRST TERM.—French, 5; freehand drawing, 3; experimental mechanics and heat, 3; zoölogy, lectures and laboratory work (vertebrates), 3; human physiology, 3; hygiene, six lectures.

SECOND TERM.—French, 5; electricity and magnetism, 3; chemical lectures, 3; chemical laboratory practice, 3; zoölogy, lectures and laboratory work (invertebrates), 3.

THIRD TERM.—French, 5; acoustics and optics, 3; chemistry, lectures, 3; botany, lectures, 3, laboratory work, 2.

SECOND YEAR.

FIRST TERM.—German, 5; organic chemistry, 2; anatomy, physiology, and hygiene of domesticated animals, 5; anatomical technology, 1; anatomy, laboratory work, 2; psychology, 2.

SECOND TERM.—German, 5; vegetable physiology, 3; veterinary pathology, parasites, and sanitary science, 5; microscopical technology, 1; histology, laboratory work, 2; vegetable physiology, laboratory work, 2.

THIRD TERM.—German, 5; medical chemistry, 3; comparative anatomy of the brain, 2; anatomy, laboratory work, 2; museum methods and experimental technology, 1; veterinary medicine and surgery, 5.

Upon the completion of this course the student is entitled to a certificate countersigned by the professor in physiology, or to one covering an equivalent amount of similar work done in either of the full four-year courses, or in one of the graduate courses. These certificates usually exempt the holder from

one of the three years of study, under the direction of a physician, commonly required for graduation in medicine.

For the requirements for admission to this course see page 29.

LANGUAGES.

I. THE ANCIENT CLASSICAL LANGUAGES.

An outline of the course of reading in the Classics is given below. Greek belongs to the course in Arts, and Latin to the courses in Arts, Literature, Philosophy, and History and Political Science. The distribution as regards the number of years of required and elective study may be seen by consulting the tabulated statements of those courses. The number of weekly exercises with all classes in Greek is three, and in Latin four, with the exceptions noted below. Instruction in Greek and Latin composition accompanies the study of the authors; lectures are occasionally substituted for recitations; and the examinations regularly comprise the translation of passages not previously seen by the student.

GREEK.

FIRST YEAR.

FIRST TERM.—Plato's Apology of Socrates; Grecian antiquities.

SECOND and THIRD TERMS.—Homer and Herodotus; the history of Greek literature.

SECOND YEAR.

FIRST TERM.—Thucydides.

SECOND and THIRD TERMS.—Euripides, Æschylus, Aristophanes (one play of each).

THIRD YEAR.

FIRST TERM.—Plato, continued.

SECOND and THIRD TERMS.—Sophocles.

FOURTH YEAR.

FIRST TERM.—Selections from the Attic orators.

SECOND and THIRD TERMS.—Dramatic poets, continued; selections from the Lyric and Bucolic poets.

LATIN.

FIRST YEAR.

First Term.—Livy.

Second Term.—Cicero's De Amicitia; the Odes of Horace (Book I).

Third Term.—The Odes (Books II–IV) and Epodes of Horace.

SECOND YEAR.

First Term.—The Agricola, Germania, and Dialogus of Tacitus; Roman antiquities.

Second Term.—Terence; the Satires of Horace (Book I); the history of Roman literature (text-book and lectures).

Third Term.—The Satires (Book II) and Epistles of Horace; the history of Roman literature.

THIRD YEAR.

First Term.—The Annals or the Histories of Tacitus: *three-hour elective course.* The Georgics of Virgil: *one-hour elective course of lectures.*

Second Term.—Juvenal: *three-hour elective course.* Cicero's Letters: *one-hour elective course of translation at sight, with lectures.*

Third Term.—Catullus, Tibullus, Propertius: *three-hour elective course.* Persius: *one-hour elective course of lectures.*

FOURTH YEAR.

First Term.—Plautus; Quintilian: *three-hour elective course.* The comparative philology of Greek and Latin: *one-hour elective course of lectures.*

Second Term.—Lucretius: *three-hour elective course.* The comparative philology of Greek and Latin: *one-hour elective course of lectures, in continuation of the work of the first term.*

Third Term.—The Letters of Pliny the Younger: *three-hour elective course.* Early Latin inscriptions and literature: *one-hour elective course of lectures, in continuation of the work of the first and second terms.*

II. ORIENTAL LANGUAGES.

None of the languages here included are required for any baccalaureate degree conferred by the University. The Professor of

Sanskrit and Living Asiatic Languages gives, in addition to special instruction, lectures bearing upon ethnographical philology and general linguistic science.

III. GERMANIC LANGUAGES.

The first two years in German are specially intended, besides preparing the student for progressive and independent work in the language, to give those who have not a classical training some grammatical discipline, and an insight into the growth and relations of Indo-Germanic speech. Instruction is also given to optional classes in the more advanced study of the Germanic languages.

GERMAN.

During the whole of the first year Whitney's Grammar and Reader are used, accompanied by Ahn's (Fischer's) exercises in writing German. In the first term a knowledge of the inflections is gained, the strong verbs are begun, and stories and ballads are translated, with daily exercises in writing. In the second term the strong verbs are completed, the syntax of nouns, uses of the moods, and the arrangement of sentences are studied, with advanced translation and the writing of German. In the third term, with advanced translation and writing, exercises in translation at sight are also given, and the relation of English to German is traced by the application of Grimm's law, in connection with the special study of etymology.

In the first term of the second year one of Schiller's or Goethe's dramas is studied, followed in the second term by extracts from Goethe's or Schiller's prose. In the third term Goethe's Hermann und Dorothea, Lessing's Minna von Barnhelm, or some similar work, is read. The work of the first term is chiefly philological, while in the second and third terms more attention is paid to literary biography and reading at sight.

During the third and fourth years occur optional lectures and recitations on German history, literature, and mythology, and courses are given varying from year to year, embracing the works of the leading authors. Classes are also formed in composition and conversation, and recent dramatic literature and the works of living novelists are read.

OTHER GERMANIC LANGUAGES.

Special instruction is offered in Gothic, Old and Middle High German, and the Scandinavian and Netherland languages.

In Gothic, the text-books are Heyne's and Bernhardt's editions of Ulfilas; in Old German, Braune's Althochdeutsches Lesebuch, with lectures on the early German alliterative poetry and the later forms of German verse. In Middle High German the epic, lyric, and didactic poetry is studied, with the addition of prose selections. The Netherland languages are pursued with special reference to the explanation of English forms and idioms, and works in modern Dutch and Flemish are read.

The Scandinavian languages are taught chiefly by means of German text-books. In Icelandic, use is made of Wimmer's Altnordische Grammatik, and Vigfusson and Powell's Icelandic Prose Reader, and lectures are given on Scandinavian history and literature.

IV. ROMANCE LANGUAGES.

FRENCH.

Otto's French Grammar is studied during the first term, and the translation of modern French plays is begun in the second. In the second year two courses are offered, one in the literature of the classical period, consisting of plays of Racine, Corneille, and Molière, with selections from contemporary memoirs of the reign of Louis XIV; and one in modern French, with special reference to its use in practical and scientific studies.

Optional courses in recent dramatic literature and literary history are given during the third and fourth years.

ITALIAN.

During the first year Ricci's Italian Principia is used with Lardelli's Letture Scelte and Manzoni's I Promessi Sposi. In the second year selections are read from Dante's Inferno and Ebert's Handbuch der Italienischen National-Literatur.

SPANISH.

Montague's Manual Grammar is used in connection with exercises in writing Spanish during the first term. In the second and third terms, Gil Blas and Moratin's El Si de las Niñas, or

similar works, are read. In the second year, Don Quijote and Calderon's El Principe Constante are read.

LITERATURE.

English Literature, and Rhetoric and General Literature, form a part of each of the general courses of study, either as required or elective work, the matter being distributed as shown in the tabulated statements of those courses.

I. ANGLO-SAXON AND ENGLISH LITERATURE.

SPECIAL COURSE.

FIRST YEAR.

SECOND TERM.—Anglo-Saxon grammar, the A.-S. Version of the Gospel according to St. John, and selections from the Homilies of Ælfric.

THIRD TERM.—Selections from King Alfred's A.-S. Version of the History of Paulus Orosius, and of Boethius De Consolatione Philosophiæ, and selections from the A.-S. Chronicle.

SECOND YEAR.

FIRST TERM.—Selections from Layamon's Brut or Chronicle of Britain, the Ancren Riwle, and the Ormulum; the Proclamation of King Henry III, and selections from Robert of Gloucester's Chronicle.

SECOND TERM.—Selections from Dan Michel's Ayenbite of Inwyt, or Remorse of Conscience, the Voiage and Travaile of Sir John Maundeville, Trevisa's Translation of Ralph Higden's Polychronicon, the Vision of William concerning Piers Plowman, Pierce the Ploughmans Crede, and the Wycliffite Versions of the Bible.

THIRD TERM.—Chaucer's Prologue to the Canterbury Tales, the Knightes Tale, the Nonne Prestes Tale, etc., and lectures on the language and versification of Chaucer.

THIRD YEAR.

FIRST and SECOND TERMS.—The critical textual study of selected poems and plays.

THIRD TERM.—Lectures on Shakespeare and contemporary dramatists.

GENERAL COURSE IN ENGLISH LITERATURE.

First Term.—Lectures on the English language and literature, from Chaucer to Shakespeare, inclusive.

Second Term.—Lectures on the English language and literature, from Milton to Cowper, inclusive.

Third Term.—Lectures on English literature of the nineteenth century.

A syllabus of the course, prepared by the professor, presents to the student the leading points of each lecture, and the order of their treatment, designates the best editions of an author's works, or parts of them, that are generally accessible, and guides the student to such sources, philological, historical, biographical, critical, etc., as enable him to read to the best advantage.

Three lectures a week are given throughout the year.

It is sometimes found advisable to depart from the chronological order, and to begin with the lectures of the second term, as given above, or of the third.

II. RHETORIC, GENERAL LITERATURE, AND ORATORY.

The course in rhetoric, general literature, and oratory extends through four years.

The first year embraces the principles of elementary rhetoric, including diction, the properties of the sentence, the structure of paragraphs, figures of speech, and the history and elements of the English language. In addition to recitations on these topics, each student writes every week an exercise, which is corrected and returned.

The second year takes up the study of narration and description, and includes the writing of essays, which, after correction, are returned to the student to be rewritten. Elocution is required during this year, and in the second and third terms each student delivers declamations before the class.

The third year includes exposition and advanced rhetoric. Original themes and orations are delivered before the class, after private criticism by the professor. During the third term, lectures are given on oratory and orators, the themes and orations being on related topics.

The fourth year continues the delivery of themes and orations,

and takes up the study of general literature, which is taught entirely by lectures and collateral reading. The lectures are on topics connected with the history of literature, its different periods, and the leading representative essayists and orators. Optional classes are formed for the special study of Shakespeare, Demosthenes, and the masters of English prose style, and for practice in oral discussion and extemporaneous speaking.

MORAL AND INTELLECTUAL PHILOSOPHY.

Instruction in Philosophy begins in the first term of the third year. During that term it comprises a study of the physiology of the nervous system in relation to mental phenomena, and the nature and origin of knowledge; and during the second term, the study of moral philosophy, theories of morals, and the development of moral sentiments.

It is resumed the third term, the subject being logic, including the laws of thought, the formulæ of reasoning, and the various methods of proof and refutation, together with the methods of investigation and the grounds of certainty.

The subject during the first term of the fourth year is the history of philosophy, and the progress of knowledge from its beginning in Greece to the present day, with criticisms on the methods of philosophy and transcendental logic.

HISTORY AND POLITICAL SCIENCE.

I. HISTORY.

The aim in the courses of instruction in History is to present, in logical and chronological sequence:

1. *General History, Ancient, Mediæval, and Modern*, with especial reference to the political and social development of the leading nations.

2. *The Constitutional History of England*, as that which has most strongly influenced our own.

3. *The Comparative Constitutional and Legislative History of various modern states*, as eliciting facts and principles of use in solving American problems.

4. *The History, Political, Social, and Constitutional, of the*

United States, with a systematic effort to stimulate the student to original research into the sources of our national history.

5. *The Philosophy of History* as shown by grouping the facts and thoughts elicited in these various courses.

GENERAL HISTORY.

The instruction in General History extends through four years, as follows:

1. General Ancient, Grecian, and Roman History, beginning with the third term of the first year and continuing through the three terms of the second year.

2. Mediæval History: General history of the social and political development of Europe during the Middle Ages, mainly by instruction in general English history during the first and second terms of the second year, and by special lectures in the third year.

3. Modern History: The history of the political and social development of Europe from the close of the Middle Ages to the present day, with especial reference to the Reformation, the Reaction, the French Revolution, the Napoleonic era, and the recent period, divided as follows:

First term: The history of Germany begun.

Second term: The history of Germany concluded, and the history of France begun.

Third term: The history of France concluded, with incidental lectures on important points and periods in the history of Italy and Spain.

Instructors: President White, Professor C. K. Adams, Assistant Professor Perkins, Mr. Burr.

ENGLISH HISTORY.

The instruction in English History is given by recitations from text-books during the entire second year, and by courses of lectures on the growth and principles of the Constitution during the third year. The student is expected to supplement these lectures by the use of some standard work for general details, and of monographs on particular subjects and epochs. While avoiding the more obscure technicalities, the aim is to present the great bases of law and policy on which the structure of the Eng-

lish government rests. The early Saxon institutions are described at some length; and the lectures follow the development of the system from this germ through its leading phases down to modern times. Special attention is paid, during the whole course, to such topics as illustrate the institutions and constitutional history of the United States.

Instructors: Professor Goldwin Smith, Professor Tuttle, Mr. Burr.

COMPARATIVE CONSTITUTIONAL AND LEGISLATIVE HISTORY.

This subject is treated, as far as possible, in the courses of lectures upon Modern History in the third year, and in a special course of lectures during the fourth year.

Instructor: President White.

AMERICAN HISTORY.

The study of American History extends through the third and fourth years. The topics to which particular attention is paid are the following: The Native Races, especially the Mound-Builders and the North American Indians; the alleged Pre-Columbian discoveries; the origin and enforcement of England's claim to North America, as against competing European nations; the motives and methods of English colony-planting in America in the seventeenth and eighteenth centuries; the development of ideas and institutions in the American colonies, with particular reference to religion, education, industry, and civil freedom; the grounds of inter-colonial isolation and of inter-colonial fellowship; the causes and progress of the movement for colonial independence; the history of the formation of the national Constitution; the origin and growth of political parties under the Constitution; the history of slavery as a factor in American politics, culminating in the civil war of 1861–1865.

In the presentation of these topics, the student is constantly directed to the original sources of information concerning them, and to the true methods of historical inquiry. The effort is also made to use American Literature as a means of illustrating the several periods of American History.

Instructor: Professor Tyler.

PHILOSOPHY OF HISTORY.

The lectures on this subject are given in the second term of the fourth year. Their object is to trace the origin and progress of civilization, and to point out the causes and institutions, civil, social, and religious, which have contributed to its advance, or tended to retard its progress. The first half of the course treats of general principles, and the latter half, of the historic progress in civilization, beginning with the settlement of the Aryan nations in Europe.

Instructor: Professor Wilson.

II. POLITICAL AND SOCIAL SCIENCE.

This division includes the following topics:

1. *Political Economy*, and the history and principles of finance.
2. *Theoretical Politics*, or the state philosophically considered.
3. *Systematic Politics*, or the state practically considered, in respect to the organization of the various functions.
4. *International Law*, including American diplomatic history, policy, and organization.
5. *American Law and Jurisprudence.*

POLITICAL ECONOMY.

The instruction in Political Economy is given by recitations from text-books in the elements of the science during the second and third terms of the third year; and by a course of lectures during the first term of the fourth year, in which practical questions arising in the study of industrial society receive attention. A course of lectures upon the science of finance, embracing a study of the comparative financial administration of constitutional nations and the various sources of public revenue, is given during the fourth year. Both these courses of lectures are to be supplemented by private reading.

Instructors: Professor H. C. Adams, Assistant Professor Potter.

THEORETICAL AND SYSTEMATIC POLITICS.

The aim of the instruction in Political Science proper is to present both the philosophical and the practical side of the subject in a logical order of treatment. It comprises the two general topics of theoretical and systematic politics.

Theoretical politics treats of primitive societies, the growth of states, forms of government, history of political literature and speculation, and the philosophy of the state.

Systematic Politics treats of states in their concrete relations, and includes such subjects as constitutional organization, legislation, administration and civil service methods, justice, revenue, military systems, and a comparative survey of existing governments. The historical and the analytical methods are both used, and the object of the course is to make the student acquainted in a scientific sense with the true principles of political organization and practice, as well as with the existing institutions of the great civilized states.

Instructor: Professor Tuttle.

INTERNATIONAL LAW AND DIPLOMACY.

Instruction in this department consists of a course of lectures given daily during the third term of the fourth year. The course treats, among other subjects, of the history and literature of the law of nations, rules of war, neutrality, prize, embassy, forms of diplomacy, history of American diplomacy, together with descriptions of some of the more famous international disputes in which the United States have been concerned.

Instructor: Professor Tuttle.

AMERICAN LAW AND JURISPRUDENCE.

The course consists of about forty lectures. The first three are devoted to the more general relations of man to government; then follow twelve lectures on the constitution of the United States, and five on the origin and development of international law; then lectures on the rights of persons and of property, with a general discussion of the nature of contracts, partnerships, and corporations; then lectures on crimes and criminal law; and the course concludes with four lectures on the legal maxims relating to sovereignty, legislation, customary law, and the judiciary.

Instructor: Professor Wilson.

The Course in History and Political Science.

Leading to the Degree of Bachelor of Philosophy.

The first two years of this course are regarded as mainly introductory to the studies which peculiarly belong to the general subjects of the course. Students who have completed the first two years in either of the courses in Arts, Literature, or Philosophy, may be admitted to full standing as juniors in the course in History and Political Science on passing a satisfactory examination in the History required in the first two years in this course.

Besides the prescribed work, lectures are given on important topics connected with the general subjects of the course, by non-resident professors and lecturers; and these lectures all the students in this course are required to attend, whenever they may be given.

FIRST YEAR.

First Term.—French *or* German, 5; Latin, 4; rhetoric, 2; geometry and conic sections, 5.

Second Term.—French *or* German, 5; Latin, 4; rhetoric, 2; algebra, 5.

Third Term.—French *or* German, 5; Latin, 4; rhetoric, 2; pre-historic times, 2; plane trigonometry, 3.

SECOND YEAR.

First Term.—French and German, 6; essays, 1; Grecian history, 2; English history, 3; Greek, Latin, modern languages, mathematics, *or* natural sciences, 3.

Second Term.—French and German, 6; essays, 1; Roman history, 2; English history, 3; Greek, Latin, modern languages, mathematics, *or* natural sciences, 6.

Third Term.—French and German, 6; essays, 1; Roman history, 2; English history, 3; theory of probabilities and statistics, 3.

THIRD YEAR.

First Term.—Mediæval and modern history, 3; English constitutional history, 2; American history,—pre-historic America and the period of discovery, 3; psychology, 2; sanitary science, labor laws, and penal discipline, 2; essays, 1; *elective*, 3.

SECOND TERM.—Modern history, 3; American history,—the planting of the American colonies, 3; political economy, 2; moral philosophy and political ethics, 2; essays and orations, 2; *elective*, 3.

THIRD TERM.—Modern history, 3; American history,—the institutions of the colonial times, 3; logic, 3; political economy, 2; essays and orations, 2; *elective*, 3.

FOURTH YEAR.

FIRST TERM.—American history,—the period of the Revolution, 1765–1789, 3; history of philosophy and the natural sciences, 3; theoretical politics, 3; finance and political economy, 5; general literature and oratory, 3.

SECOND TERM.—American history,—first national period, 1789–1820, 3; philosophy of history, 3; systematic politics, 5; comparative constitutional history, 2; general literature and oratory, 3.

THIRD TERM.—American history,—second national period, 1820–1865, 3; comparative constitutional history, 2; American law and jurisprudence, 5; international law and diplomacy, 5; orators and oratory, 1.

For requirements for admission to this course see page 29.

GENERAL COURSES OF STUDY.

The Course in Arts.

Leading to the Degree of Bachelor of Arts.

FIRST YEAR.

First Term.—Greek, 3; Latin, 4; rhetoric, 2; Grecian history, 2; geometry and conic sections, 5; hygiene, six lectures.

Second Term.—Greek, 3; Latin, 4; rhetoric, 2; Roman history, 2; algebra, 5.

Third Term.—Greek, 3; Latin, 4; rhetoric, 2; Roman history, 2; trigonometry, 5.

SECOND YEAR.

First Term.—Greek, 3; Latin, 4; composition and elocution, 1; *elective*, 7.

Second Term.—Greek, 3; Latin, 4; composition and elocution, 1; *elective*, 7.

Third Term.—Greek, 3; Latin, 4; composition and elocution, 1; *elective*, 7.

THIRD YEAR.

First Term.—Essays, 1; psychology, 2; *elective*, 12.

Second Term.—Essays and orations, 2; moral philosophy, 2; *elective*, 11.

Third Term.—Essays and orations, 2; logic, 3; *elective*, 10.

FOURTH YEAR.

First Term.—Literature and oratory, 3; history of philosophy, 3; *elective*, 9.

Second Term.—Literature and oratory, 3; *elective*, 12.

Third Term.—Literature and oratory, 1; *elective*, 11.

Students electing ***Physics*** are required to continue the study through one complete part of the subject, and those electing *Chemistry*, to continue it through the two terms.

For the requirements for admission to this course see page 29.

The Course in Literature.

Leading to the Degree of Bachelor of Literature.

FIRST YEAR.

FIRST TERM.—Latin, 4; rhetoric, 2; Grecian history, 2; geometry and conic sections, 5; physiology, 3; hygiene, six lectures.

SECOND TERM.—Anglo-Saxon, 5; Latin, 4; rhetoric, 2; Roman history, 2; algebra, 5.

THIRD TERM.—Anglo-Saxon, 3; Latin, 4; rhetoric, 2; Roman history, 2; trigonometry, 5.

SECOND YEAR.

FIRST TERM.—Anglo-Saxon, 3; French, 5, and German, 3, *or* German 5, and French, 3; Latin, 4; composition and elocution, 1.

SECOND TERM.—Early English, 3; French, 5, and German, 3, *or* German, 5, and French, 3; Latin, 4; composition and elocution, 1.

THIRD TERM.—Early English, 2; French, 5, and German, 3, *or* German, 5, and French, 3; Latin, 4; composition and elocution, 1.

THIRD YEAR.

FIRST TERM.—English literature, 3; essays, 1; psychology, 2; Latin, modern languages, *or* science, 10.

SECOND TERM.—English literature, 3; essays and orations, 2; moral philosophy, 2; Latin, modern languages, *or* science, 9.

THIRD TERM.—English literature, 3; essays and orations, 2; logic, 3; botany, 3; Latin, modern languages, *or* science, 5.

FOURTH YEAR.

FIRST TERM.—Special literature, 2; literature and oratory, 3; history of philosophy, 3; Latin, modern languages, *or* science, 7.

SECOND TERM.—Special literature, 2; literature and oratory, 3; philosophy of history, 3; Latin, modern languages, *or* science, 7.

THIRD TERM.—Special literature, 2; literature and oratory, 1; American law, 5; Latin, modern languages, *or* science, 4.

For the requirements for admission to this course, see page 29.

The Course in Philosophy.

Leading to the Degree of Bachelor of Philosophy.

FIRST YEAR.

FIRST TERM.—French *or* German, 5; Latin, 4; rhetoric, 2; geometry and conic sections, 5; hygiene, six lectures.

SECOND TERM.—French *or* German, 5; Latin, 4; rhetoric, 2; algebra, 5.

THIRD TERM.—French *or* German, 5; Latin, 4; trigonometry, 5; botany, 3.

SECOND YEAR.

FIRST TERM.—French *or* German, 3; composition and elocution, 1; analytical geometry, 5; experimental mechanics and heat, 3; zoölogy, lectures and laboratory work (vertebrates), 3.

SECOND TERM.—French *or* German, 3; composition and elocution, 1; electricity and magnetism, 3; chemistry, lectures, 3; zoölogy, lectures and laboratory work (invertebrates), 3; modern languages, calculus, *or* science, 5.

THIRD TERM.—French *or* German, 3; composition and elocution, 1; acoustics and optics, 3; chemistry, lectures, 3; modern languages, calculus, *or* science, 5.

THIRD YEAR.

FIRST TERM.—English literature, 2; essays, 1; physics *or* chemistry, laboratory work, 3; geology, 3; psychology, 2; languages, mathematics *or* science, 5.

SECOND TERM.—English literature, 2; essays and orations, 2; descriptive astronomy, 3; physics *or* chemistry, laboratory work, 3; languages, moral philosophy *or* science, 5.

THIRD TERM.—English literature, 2; essays and orations, 2; physical astronomy, 3; physics *or* chemistry, laboratory work, 3; logic, 3; languages *or* science, 5.

FOURTH YEAR.

FIRST TERM.—Literature and oratory, 3; history of philosophy, 3; *elective*, 9.

SECOND TERM.—Literature and oratory, 3; philosophy of history, 3; *elective*, 9.

THIRD TERM.—Literature and oratory, 1; American law, 5; *elective*, 6.

Any student in the course in Philosophy may take the Grecian and Roman history of the first year as an extra study and receive credit for the same towards graduation.

For the requirements for admission to this course see page 29.

The Course in Science.

Leading to the Degree of Bachelor of Science.

FIRST YEAR.

FIRST TERM.—French, 5, and German, 3, *or* German, 5, and French, 3; rhetoric, 2; geometry and conic sections, 5; hygiene, six lectures.

SECOND TERM.—French, 5, and German, 3, *or* German, 5, and French, 3; rhetoric, 2; algebra, 5.

THIRD TERM.—French, 5, and German, 3, *or* German, 5, and French, 3; trigonometry, 5; botany, 3.

SECOND YEAR.

FIRST TERM.—French *or* German, 3; composition and elocution, 1; analytical geometry, 5; experimental mechanics and heat, 3; zoölogy, lectures and laboratory work (vertebrates), 3.

SECOND TERM.—French *or* German, 3; composition and elocution, 1; chemistry, lectures, 3; electricity and magnetism, 3; zoölogy, lectures and laboratory work (invertebrates), 3; calculus *or* science, 5.

THIRD TERM.—French *or* German, 3; composition and elocution, 1; acoustics and optics, 3; chemistry, lectures, 3; calculus *or* science, 5.

THIRD YEAR.

FIRST TERM.—English literature, 2; essays, 1; physics, laboratory work, 3; organic chemistry, 2; geology, 3; *elective*, five hours, of which at least three must be given to one of the following sciences: *botany*, *chemistry*, *zoölogy*.

SECOND TERM.—English literature, 2; essays and orations, 2; descriptive astronomy, 3; physics, laboratory work, 3; economic geology, 3; *elective*, three hours, which must be given to one of the following sciences: *botany*, *chemistry* (including *mineralogy*), *zoölogy*.

THIRD TERM.—English literature, 2; essays and orations, 2; physical astronomy, 3; descriptive geometry, 3, drawing, 1; physics, laboratory work, 3; *elective*, two hours, which must be given to one of the following sciences: *botany*, *chemistry*, *geology*, *zoölogy*.

FOURTH YEAR.

FIRST TERM.—*Elective*, fifteen hours, of which at least eight must be given to two of the following sciences; three or five hours may be devoted to each science taken: *botany*, *chemistry*, *geology*, *zoölogy*.

SECOND TERM.—Political economy, 2; *elective*, thirteen hours, subject to the same conditions as in the first term of this year, except that chemistry may include mineralogy.

THIRD TERM.—Constitution of the United States, twelve lectures; *elective*, eleven hours, subject to the same conditions as in the first term of this year.

The elective hours not required for science in the third and fourth years may be devoted to either scientific, literary, historical, or philosophical subjects. In electing their studies in science for the third and fourth years students are required to take at least the minimum amount given throughout the year of each science elected.

Students intending to take the physics of the fourth year must take the calculus of the second year; those intending to take the geology of the fourth year must take blow-pipe determination of minerals before that year.

For the requirements for admission to this course see page 29.

The Course in Science and Letters.

Leading to the Degree of Bachelor of Science.

FIRST YEAR.

First Term.—French, 5, and German 3, *or* German, 5, and French, 3; rhetoric, 2; geometry and conic sections, 5; hygiene, six lectures.

Second Term.—French, 5, and German, 3, *or* German, 5, and French, 3; rhetoric, 2: algebra, 5.

Third Term.—French, 5, and German, 3, *or* German, 5, and French, 3; rhetoric, 2; trigonometry, 5.

SECOND YEAR.

First Term.—French *or* German, 3; composition and elocution, 1; physiology, 3; zoölogy, lectures and laboratory work (vertebrates), 3; modern languages, analytical geometry *or* science, 5.

Second Term.—French *or* German, 3; composition and elocution, 1; chemistry, lectures, 3; zoölogy, lectures and laboratory work (invertebrates), 3; modern languages, calculus *or* science, 5.

Third Term.—French *or* German, 3; composition and elocution, 1; chemistry, lectures, 3; botany, 3; modern languages, calculus *or* science, 5.

THIRD YEAR.

First Term.—English literature, 2; essays, 1; experimental mechanics and heat, 3; psychology, 2; geology, 3; *elective*, 4.

Second Term.—English literature, 2; essays and orations, 2; descriptive astronomy, 3; electricity and magnetism, 3; moral philosophy, 2; *elective*, 3.

Third Term.—English literature, 2; essays and orations, 2; physical astronomy, 3; acoustics and optics, 3; logic, 3; *elective*, 3.

FOURTH YEAR.

First Term.—Literature and oratory, 3; history of philosophy, 3; *elective*, 9.

Second Term.—Literature and oratory, 3; philosophy of history, 3; *elective*, 9.

Third Term.—Literature and oratory, 1; American law, 5; *elective*, 6.

For the requirements for admission to this course see page 29.

THE UNIVERSITY LIBRARY.

The Library contains about forty thousand volumes, besides fifteen thousand pamphlets. It is made up chiefly of the following collections: A selection of about five thousand volumes purchased in Europe in 1868, embracing works illustrative of agriculture, the mechanic arts, chemistry, engineering, the natural sciences, physiology, and veterinary surgery; THE ANTHON LIBRARY, of nearly seven thousand volumes, consisting of the collection made by the late Professor Charles Anthon, of Columbia College, in the ancient classical languages and literature, besides works in history and general literature; THE BOPP LIBRARY, of about twenty-five hundred volumes, being the collection of the late Professor Franz Bopp, of the University of Berlin, relating to oriental languages, oriental literature, and comparative philology; THE GOLDWIN SMITH LIBRARY, of thirty-five hundred volumes, presented in 1869 to the University by Professor Goldwin Smith, comprising chiefly historical works, and editions of the English and ancient classics—increased during later years by the continued liberality of the donor; the publications of the Patent Office of Great Britain, about three thousand volumes, of great importance to the student in technology and to scientific investigators; THE WHITE ARCHITECTURAL LIBRARY, a collection of over a thousand volumes relating to architecture and kindred branches of science, given by President White; THE KELLY MATHEMATICAL LIBRARY, comprising eighteen hundred volumes and seven hundred tracts, presented by the late Hon. William Kelly, of Rhinebeck; THE CORNELL AGRICULTURAL LIBRARY, bought by the Hon. Ezra Cornell, chiefly in 1868; THE SPARKS

LIBRARY, being the library of the late Jared Sparks, president of Harvard University, consisting of upwards of five thousand volumes and four thousand pamphlets, relating chiefly to the history of America; THE MAY COLLECTION, relating to the history of slavery and anti-slavery, the nucleus of which was formed by the gift of the library of the late Rev. Samuel J. May, of Syracuse.

By the establishment of the McGraw Library Fund, the income of which will be available after the present year, and which is to be applied to the support and increase of the University Library, the efficiency of the Library both as regards the number of books and the facilities for their use will be greatly enlarged. Beginning with the year 1882, it is proposed to issue a serial containing classified lists of recent accessions, and of books in various departments, as well as other bibliographical matter intended to assist students in their use of the Library.

The Library is a circulating one so far as the members of the Faculty are concerned, and a library of reference for students. Undergraduates have free access to a collection of cyclopædias, dictionaries, and works of reference in the various departments of study, but they apply to the librarians for other works desired. Graduate students are admitted to the alcoves.

GRADUATION.

TIME REQUIRED FOR GRADUTION.

No person may receive a baccalaureate degree who has not spent four entire years in the University, unless he has pursued elsewhere part of the studies of his course. Students admitted to advanced studies must, before the close of their first year, pass examination on the previous work of the classes they enter.

GRADUATION THESES.

Each student is required, before taking a degree, to submit to the Faculty a satisfactory oration, poem, or essay on some subject in science or literature, and to deposit a copy in the Library.

THE DEGREE OF BACHELOR.

The degree of Bachelor of Science is conferred after the satisfactory completion of any one of the following courses: Science, Science and Letters, Chemistry and Physics, Mathematics, and Natural History. The particular course is specified in the diploma.

The degrees of Bachelor of Arts, of Literature, of Philosophy, of Agriculture, of Architecture, of Civil Engineering, and of Mechanical Engineering are conferred after the satisfactory completion of the corresponding courses. The degree of Bachelor of Philosophy is also conferred after the satisfactory completion of the course in History and Political Science. The degree of Bachelor of Veterinary Science is conferred only after the completion of a full course of four years in that department.

No person is allowed to receive more than one degree at the same Commencement.

ADVANCED DEGREES.

Graduate courses of study leading to advanced degrees are provided for in the following general departments: Chemistry and Physics, Mathematics, Natural History; History and Political Science; Comparative Philology, Ancient Classical Languages and Literature, Modern European Languages and Literature, Oriental Languages and Literature; Philosophy and Letters.

A graduate who desires to take an advanced degree should apply to the Faculty to be admitted as a candidate for that degree and in his application should state in what departments he wishes to work.

The degree of Master of Arts or Master of Science is conferred on those who have taken the corresponding baccalaureate degree here, or elsewhere where the requirements for that degree are equal to those of this University, on the following conditions:

1. The candidate must spend at least one year at the University in a course of study marked out for him by the Faculty, must present a satisfactory thesis, and pass an examination.

2. The same degrees are conferred without residence on graduates of this University only, on conditions the same in all respects as above, except that the degree is not given until three years after the baccalaureate degree has been conferred.

3. Any person who has taken a baccalaureate degree in this University may become a candidate for either of the above second degrees by passing such additional examinations as may be required for the corresponding first degree.

The degree of Master of Science is conferred on graduates in the course in Philosophy on the same conditions as if they had been graduated in the course in Science.

The degree of Civil Engineer is conferred (1) on bachelors of Civil Engineering, after two years of study and practice, on passing the requisite examination and presenting a satisfactory thesis; (2) on those who have completed the five-year course, at their graduation.

The degree of Doctor of Veterinary Medicine is conferred on

bachelors of Veterinary Science after two years of additional study, on passing the requisite examination.

The degree of Doctor of Philosophy is conferred on graduates of this University, and of other universities and colleges whose requirements for the baccalaureate degree are equal to those of this University, on the following conditions:

1. In order to become a candidate the applicant must have, over and above what is required for graduation in the course in Philosophy, a knowledge of Greek equal to that required for admission to the course in Arts.

2. The candidate must spend at least two years at the University pursuing a course of study marked out by the Faculty as leading to this degree.

3. He must, at least six weeks before Commencement, present a meritorious thesis upon some subject included in the course, and pass the requisite examination.

The degree of Doctor of Science is conferred on graduates of this University, and of other universities and colleges whose requirements for the baccalaureate degree are equal to those of this University, on the following conditions:

1. In order to become a candidate the applicant must have: a knowledge of Latin and Greek at least equal to that required for admission to the course in Natural History; a knowledge of French and German equal to that required for graduation in the course in Science; a knowledge of science, of literature, and of philosophy equal to that required for graduation in the course in Philosophy.

2. The candidate must spend at least three years, two of them at this University, in the study of not less than two scientific subjects, approved by the Faculty, in one or more of the departments of Chemistry and Physics, Mathematics, and Natural History.

3. He must pass an examination upon these subjects, showing in one of them special attainments, and must present a meritorious thesis based on special investigations, or make some other contribution to science.

Candidates for the degree of Doctor are required to print their

theses and deposit ten copies in the Library. Other candidates for advanced degrees are required to deposit one copy.

No student in a graduate course is allowed to take two degrees for the some course, to take any inferior degree for any part of the study that leads to a higher one, or to be a candidate for more than one degree at the same time.

Candidates for a second degree are required to make application to the Registrar and present their theses at least twenty days before Commencement. The examinations for advanced degrees are held during the second week before Commencement.

MISCELLANEOUS INFORMATION.

TERMS AND VACATIONS.

The academic year is divided into three terms, and there are three vacations.

Commencement day is the third Thursday in June.

The first term begins, after a vacation of thirteen weeks, on the Tuesday following the eleventh day of September, and ends on the Friday after the fourteenth day of December.

The second term begins on the Tuesday after the second day of January; except when, in leap-year, that Tuesday is the third day of January, in which case it begins on the Tuesday after the third day. It ends on the Friday after the twenty-third day of March.

The third term begins on the second Saturday after the end of the second term; the instruction begins on the Monday following, and continues until Commencement.

For the terms and vacations of the present academic year, see the calendar.

INQUIRIES REGARDING DEPARTMENTS.

Persons wishing more detailed information than is given in the *Register* as to courses of study, methods of instruction, and the like, may address the professor in charge of the department concerned.

DIRECTIONS TO CANDIDATES FOR ADMISSION.

Candidates for admission will obtain permits for examination at the Registrar's office (in the south University building), and the results of examinations may be ascertained from the Registrar. Each person, upon admission, receives a copy of the "Rules for the Guidance of Students," and is thereafter supposed to be acquainted with its contents.

REGISTRATION.

The registration day for each term is indicated in the calendar. On that day each student qualified for admission, whether previously a member of the University or not, is required to give notice of his studies for the term to the Registrar in person and obtain a ticket of registration. No person is allowed to register at any other time, except by permission of the Faculty. In order to join any class, the student must show his registration ticket to the instructor in charge.

EXERCISES OF THE TERM.

A printed schedule of the University exercises is issued at the beginning of each term. Most of the lectures and recitations occur between the hours of 8 a. m. and 1 p. m., from Monday to Friday inclusive. Every student is required to take the equivalent of fifteen hours of recitations a week, exclusive of military drill. Two and a half hours of laboratory practice, or three hours of drafting or shop-work, are regarded as the equivalent of one recitation.

EXAMINATIONS.

The regular examinations in all studies are held at the end of each term. Failure at examination entails forfeiture of position in the class, or exclusion from the course, or, in some cases, from the University. The *course-book* affords the student an opportunity of preserving a record of his examinations; it is procurable at the bookstores, and the entries in it are made by the Registrar, or by the heads of departments.

PAYMENTS TO THE UNIVERSITY.

The fee for tuition is $25 a term, payable within ten days after registration.

Tuition is free to *state students*, to *resident graduates*, and to students pursuing either of the prescribed courses in *Agriculture*, and *intending to complete* that course.

Every person taking laboratory practice in Chemistry, Physics, Zoölogy, or Entomology must deposit with the Treasurer security for the materials to be used in the laboratory. Students residing in the University buildings are required to pay their room-

bills one term in advance. All members of the University are held responsible for any injury done by them to its property.

A fee of $5, to cover expenses of graduation, degrees, etc., is charged to each person taking the baccalaureate degree; a fee of $10, to each person taking an advanced degree. These fees must be paid at least three days before Commencement.

EXPENSES OF RESIDENCE.

The following is a fair estimate of the yearly expenses:

Tuition, $25 a term, - - - - - - -	$ 75.00
Room, board, lights, fuel, and laundry, about -	200.00
Text-books, etc, about - - - - - - -	25.00
Total, - - - - - -	$300.00

The cost for board, rent of furnished room, fuel and lights at the Sage College, varies from $5 to $6.50 a week. A student occupying alone one of the most desirable rooms pays $6.50 a week. If two occupy such a room together, the price is $5.75. Those occupying less desirable rooms, with two in a room, pay $5 a week each. The entire building is warmed by steam, and, in most cases, the sleeping apartment is separate from the study-room.

The expense of living in Ithaca varies, for board, room, fuel, and lights, from $4 to $7 a week. In many cases students, by the formation of clubs, reduce their expenses to sums ranging from $2.50 to $3.50 a week for board.

THE McGRAW-FISKE HOSPITAL.

In the year 1881, the sum of forty-five thousand dollars was bequeathed by Mrs. Jenny McGraw Fiske as a provision for the care of students who may fall ill during their attendance at the University. It is proposed that a portion of this sum be devoted to the erection of a cottage hospital, made comfortable and attractive, and thoroughly equipped in all respects; and that a trained nurse be attached to it, who shall be ready to give attention the moment it is needed.

APPENDIX.

STATE SCHOLARSHIPS.

The laws of the State of New York [chap. 585 §9, chap. 654 §1] provide that the University "shall annually receive students, one from each assembly district in the State, to be selected as hereinafter provided, and shall give them instruction in any or in all the prescribed branches of study in any department of said institution, free of any tuition fee, or of any incidental charges, to be paid to said university, unless such incidental charges shall have been made to compensate for damages needlessly or purposely done by the students to the property of said university."

There are one hundred twenty-eight assembly districts, and therefore one hundred twenty-eight free scholarships, each good for four years.

COMPETITIVE EXAMINATIONS.

The law provides that "the candidates in each county or city shall meet at such place and time in the year as the school commissioner or commissioners of the county and the boards of education of the cities in those counties which contain cities, shall appoint; and the said commissioner or commissioners, and the said board of education, or such of them as shall attend and act, shall proceed to examine said candidates and determine which of them are the best scholars."

The law is mandatory and imposes upon school commissioners of counties and boards of education of cities the duty, which they cannot avoid, of holding such competitive examinations once each year. It is understood to confer a right upon every person who is qualified to enter the examination, and who desires to obtain the scholarship, to have such an examination held; and it is believed that any such candidate for the scholarship can en-

force his right, if need be, by an appeal to the proper state authorities.

The law which requires the examination to be held, requires also, by implication, that due public notice shall be given of the time and place. When it shall be held and where it shall be held, is left to the discretion of the commissioners and the boards of education; but doubtless it ought to be held in the summer after the close of the public schools for the season, and before the beginning of the fall term of the University.

Only one examination can be held during the year in any one county, and, except to fill vacancies as below, appointments can be made but once a year.

The law does not designate the studies upon which candidates shall be examined, nor have the trustees of the University expressed any opinion on the subject.

CANDIDACY.

The law provides that "the said free instruction shall moreover be accorded to said students in consideration of their superior ability, and as a reward for superior scholarship in the academies and public schools of this state. . . . In making these selections preference shall be given (where other qualifications are equal) to the sons of those who have died in the military or naval service of the United States; consideration shall be had also to the physical ability of the candidate. . . . But in no case shall any person having already entered the said university be admitted as one of such candidates."

The trustees of the University understand the law to mean that candidates must have been educated in the academies or public schools of the state, and in the county in which they offer themselves for the competition. Not that they must necessarily be residents of the county in which they seek the scholarship, but only that they have attended an academy or public school long enough to be entitled to be regarded as having obtained their education, or at least a large part of it, in the county. The length of time is not fixed by law.

They do not understand that a person otherwise qualified to be a candidate, can be debarred from entering the examination, in consequence of having finished his studies and been out of school

for one or two years; especially if during this time he has been occupied in providing the means of defraying his expenses while attending the University. Nor do they think that the fact of his having been engaged out of the county during this time and for the purpose above mentioned ought to work to his disadvantage.

If, however, a person has been attending school, whether a public or a private school, out of the county, for the period which intervenes between his attendance upon the schools in the county and his application to be received as a candidate, this, they think, ought to exclude him from the examination in that county.

APPOINTMENT.

The law provides that the school commissioners of counties and boards of education of cities shall determine by the competitive examination above noted which of the duly qualified candidates "are the best schollars." It says: "And they shall then select therefrom to the number of one from each assembly district in said county or city, and furnish the candidates thus selected with a certificate of such election, which certificate shall entitle said student to admission to said university, subject to the examination and approval of the faculty of said university."

In deciding upon the merits of the competitors and awarding the certificates, no regard need be paid to the assembly district in which the candidate has his residence, or has attended school, but the certificate must name the district for which the appointment is made.

The certificate of scholarship must in all cases be awarded on the basis of the competitive examination, and not on any examination held otherwise or elsewhere, or on any testimonials obtained from any other source.

In all cases of contested or duplicate certificates, the trustees have decided, and instructed their treasurer, to accept the first certificate that is regular on its face and granted by the proper authorities. The University proposes to leave all questions as to the regularity of the proceedings and the rights of the respective claimants to be adjusted in the county from which the student comes.

No allowance is made for absence or non-attendance upon the

University by a student holding a state scholarship. His certificate secures him free tuition for only that part of the four years during which he is in attendance upon his University duties.

VACANCIES.

Whenever any student selected as above described shall have been from any cause removed from the University before the expiration of the time for which he was selected, then one of the competitors to his place may be selected to succeed him therein, as the school commissioner or commissioners of the county or the board of education of the city may direct. Preference is rightly given to competitors in the order of the superiority of their scholarship.

A certificate is good for four years from the time when the examination is held, and in case of a new certificate to fill a vacancy, that certificate will be accepted for only that portion of the four years which remains unexpired.

No appointment can be made from one county to fill a vacancy in another county.

Neglect to appoint does not create a vacancy which can be legally filled.

ENTRANCE EXAMINATION PAPERS.

I. ENGLISH GRAMMAR.

1. Embody in a connected account the following particulars: (*a*) name in full, (*b*) birth-place, (*c*) age, (*d*) school or schools where fitted, (*e*) intended course of study, (*f*) purpose in seeking a college education.

2. Why is a verb inflected?

3. Use *better*, in an example, as (*a*) a verb; (*b*) an adjective; (*c*) an adverb.

4. State the two principal uses of the compound personal pronouns.

5. In what respect does *which*, as an interrogative, differ from *who* and *what?*

6. How can an adjective be turned into a descriptive clause?

7. State when *shall*, and when *will*, is to be used as an auxiliary in the first person.

8. How are progressive forms in the present and preterit made?

9. Mention the principal classes of subordinating conjunctions, and give an example of each class.

10. Distinguish between the same word used as an adverb and as a conjunction.

11. Write out a complex sentence, with a subordinate clause in the past tense, indicative mode, underlining the clause.

12. Explain the use of *few* and *a few; elder* and *older; latter* and *later; a thousand men; many a man.*

13. What kinds of nouns have no singular?

14. Parse the following: *Which of these do you want?*

15. Explain the meaning of the following terms: *impersonal, indirect object, genitive, gerund, complement, finite, orthoëpy, distributive, analysis, predicative, factitive, augmentative.*

16. Write out correctly the following sentences: (*a*) Never was a man so teased, or suffered half so much uneasiness as I have done to-day. (*b*) How will we know who is the greatest of the two? (*c*) I, and not they, am to remain. (*d*) Either one of the four first in the class were good scholars. (*e*) I never have, nor never will attack him. (*f*) Scarcely was Elizabeth seated on the throne, than she began to feel the alarming embarrassments of her position. (*g*) Four months interest are due. (*h*) Nothing need to be said so firmly, and nothing oftener than this.

17. State your reasons for making any change in writing out the preceding sentences.

18. Write out in prose the following verses, making complete grammatical sentences, supplying all ellipses, and changing the inversions:

"Heaven witness,
I have been to you a true and humble wife,
At all times to your will conformable:
Ever in fear to kindle your dislike,
Yea, subject to your countenance; glad, or sorry,
As I saw it inclined. When was the hour,
I ever contradicted your desire,
Or made it not mine too? What friend of mine,
That had to him derived your anger, did I

Continue in my liking? Nay, gave notice
He was from thence discharged?"

19. Analyze the following:
"Wisely and slow: They stumble that run fast."

II. GEOGRAPHY.

1. Draw an outline map of North America.
2. Name the five grand divisions in the order of their size.
3. Between what parallels of latitude does Russia, in Europe, lie? What are its climate? population? productions?
4. Bound Italy, and name its capital.
5. State the positions of Algiers and Tunis, in Africa, and state the character and number of the population.
6. Name the three great rivers of South America.
7. Describe the great mountain system of the Western Continent.
8. Describe the desert of Sahara.
9. Which is further north—New York or Paris? Washington or Madrid? San Francisco or Hong Kong?
10. What is meant by the tropics of Cancer and Capricorn? the Arctic circle? the Antarctic circle?
11. What is the Arctic current? How is it caused, and what becomes of it?
12. What are the trade winds, and how are they caused?
13. How could one sail by the shortest route from Rio Janeiro to St. Petersburg?
14. What states would a straight line between Portland, Maine, and Portland, Oregon, cross?
15. In coasting between Charleston, South Carolina, and the Columbia river, what countries would you pass on the right?

III. ELEMENTARY PHYSIOLOGY.

1. (*a*) Give diagrams of the teeth of one side of the lower jaw. (*b*) State their names. (*c*) State their uses. (*d*) Give a diagram of a longitudinal section of a simple tooth, with the names of its parts.
2. (*a*) Give an outline diagram of the neck and trunk, with the names of the regions. (*b*) Insert an outline of the alimentary

canal, with the names of its parts, and show the relative position of the stomach and diaphragm.

3. (*a*) What is the diaphragm? (*b*) Give an outline diagram indicating the condition of the diaphragm before and after inspiration.

4. (*a*) State the digestive actions of the pancreatic juice. (*b*) Which of them is peculiar? (*c*) Name some uses of the liver.

5. (*a*) Of what is the heart chiefly composed? (*b*) Give a diagram of the left side of the heart, showing the relative thickness of the walls, the position of the vessels and valves, and naming all the parts. (*c*) Give a diagram of a cross-section of the heart, about midway between the base and the apex.

IV. ARITHMETIC.

1. Define: an abstract number, the prime factors of a number, a quotient, a mixed number, cube root, percentage, bank discount, compound interest.

2. Get the sum of five, five-tenths, thirty-seven thousandths, one-thousand millionths, XIX, MDCCCLXXXI, $.\dot{1}\dot{8}$.

3. Find all the common divisors of 225, 2025, 8100

4. Divide $\frac{4}{5}$ of 91 by $\frac{19}{27}$ of 637.

5. What is the amount at compound interest of \$500 for 2^y, 6^m, at 7 per cent.?

6. Get the square root of 530, to three decimal places, and give the reasons for the several steps in the work.

7. Give the common and the metric table for liquid measure.

How many litres in 10^{gal} 3^{qt} 1^{pt} 3^{gi}, the gallon being 231 cubic inches, and the metre 39.37 inches?

V. PLANE GEOMETRY.

1. Define: an axiom, a point, a right angle, two parallel lines, a polygon, the apothem of a regular polygon, a circle, a tangent to a circle, the area of a surface, a commensurable ratio.

Draw an obtuse-angled triangle; then draw the three altitudes, taking the three sides of the triangle in turn as bases.

2. If two sides of one triangle be respectively equal to two sides of another, but the included angle in the first triangle be greater than the included angle in the second, the third side of the first triangle is greater than the third side of the second.

3. A straight line perpendicular to a radius at its extremity is tangent to the circle, and conversely.

4. In any triangle, if a straight line be drawn from the vertex to the middle of the base, then:

(1) The sum of the squares of the two sides is equal to twice the square of half the base increased by twice the square of the medial line.

(2) The difference of the squares of the two sides is equal to twice the product of the base by the distance from the middle of the base to the foot of the perpendicular from the vertex to the base.

5. The area of a trapezoid is equal to the product of its altitude by half the sum of its parallel sides.

If the area of a trapezoid be 80 square yards, the perpendicular 4 yards, and one of the parallel sides 15 yards; what is the other parallel side?

6. To construct the mean proportional between two lines.

VI. ELEMENTARY ALGEBRA.

1. Define: known and unknown quantities, positive and negative quantities, addition, a common multiple of two or more numbers, a radical, an equation, a theorem.

2. Resolve m^4-n^4 into three prime factors.

3. Reduce the fraction $\frac{\sqrt{(x^2+xy+y^2)}}{\sqrt{(x-y)}}$ to an equivalent fraction having a rational denominator.

4. Divide $x+y+z-3\sqrt[3]{xyz}$ by $x^{\frac{1}{3}}+y^{\frac{1}{3}}+z^{\frac{1}{3}}$.

5. For $8 I can buy 2 lbs. of tea, 10 lbs. of coffee, and 20 lbs. of sugar, or 3 lbs. of tea, 5 lbs. of coffee, and 30 lbs. of sugar, or 5 lbs. of tea, 5 lbs. of coffee, and 10 lbs. of sugar. What are the prices?

6. Solve the equation

$$\frac{ax-b}{4}+\frac{a}{3}=\frac{bx}{2}-\frac{bx-a}{3}.$$

7. Solve the equation $x+5+\sqrt{(x+5)}=6$, giving all the roots.

8. Solve the equation.

$$\frac{x+a}{x-2a}+\frac{x-2a}{x+a}=1,$$

and get the sum, and the product, of the two roots.

VII. SOLID GEOMETRY AND CONIC SECTIONS.

1. Define: a parallelopiped, the locus of a point, the slant height of a pyramid, a regular polyedron, a spherical segment, a parabola, the eccentricity of an ellipse.

2. Two triedral angles are either equal or symmetrical, when the three face-angles of the one are respectively equal to the three face-angles of the other.

3. Two prisms are equal, if three faces including a triedral angle of the one be respectively equal to three faces, similarly placed, including a triedral angle of the other.

4. The angles of a spherical triangle are 90°, 105°, and 135°. Find the area in square inches, the radius of the sphere being 30 inches.

5. The volume of a spherical sector is equal to the product of the area of the zone which forms its base by one third of the radius of the sphere.

6. The square of the ordinate of any point of a parabola is equal to the product of the parameter of the curve by the abscissa of the point.

7. The lateral surface of a pyramid is greater than the base.

VIII. ADVANCED ALGEBRA.

1. Prove the formula for the development of $(a+x)^n$; and from this formula get the development of $(1+x+x^2)^3$, and four terms of $(a^2-x^2)^{-\frac{3}{2}}$.

2. Prove the formula for the sum of a geometrical progression; the first term, the ratio, and the number of terms being given. From this formula obtain an expression for the amount of a deferred annuity at compound interest; the annual payment, rate, and time being given.

3. By the method of differences, find log 24, by continuing the series: log 20 = 1.3010, log 21 = 1.3222.
log 22 = 1.3424, log 23 = 1.3617.

From the same data, find log $21\frac{1}{2}$ by interpolation.

4. Prove that $\log_a b \cdot \log_b x = \log_a x$.

5. By the method of undetermined coefficients, prove that

if $y = x + x^2 + x^3 + \ldots$, then also $x = y - y^2 + y^3 - \ldots$

6. By continued fractions, find five successive approximations to the value of $\sqrt{2}$.

7. Depress the equation $x^4+2x^3+x^2=35x+74$, by removing a commensurable root, and then find an incommensurable root correct to two decimal places.

8. Prove that, if the coefficients of an equation with one unknown quantity be real, any imaginary roots enter it in pairs.

IX. TRIGONOMETRY.

1. What trigonometric functions are reciprocals of each other? If $\sin A=\frac{3}{5}$, find the values of all the other trigonometric functions of A. Which of these functions are positive, and which are either positive or negative?

2. Prove that $2\sin^2\frac{1}{2}A=1-\cos A$.

3. In any plane triangle, prove that $a^2=b^2+c^2-2bc\cos A$.

4. Express in degree-measure the angles $\frac{1}{6}\pi$, .7854, $-\frac{3}{2}\pi+1$.
Express in π-measure the angles 120°, 225°, −67° 30′.
What is the difference of longitude, in degrees, between Washington and Greenwich, the difference in time being $5^h\ 8^m\ 12.09^s$?

5. Find approximately the distance at which a coin, an inch in diameter, must be held from the eye, so as just to conceal the moon, the apparent angular diameter of the moon being half a degree.

6. In any spherical triangle prove that

$$\cos a=\cos b\ \cos c+\sin b\ \sin c\ \cos A.$$

7. Two sides of a triangle are 18^{ft} and 2^{ft}, and the included angle is 55°; solve the triangle and find its area.

8. In a spherical triangle, given $A=37°\ 28'$, $a=25°\ 14'$, $C=90°$; solve the triangle.

X. FRENCH.

I.

Translate the following sentences into French.

1. Where does that little girl come from? She resides at my uncle's in London, and has just arrived from England.

2. How long is it since your mother saw her? We used to go to school with her, and my mother knew her there.

3. Do you like meat? No, I prefer bread and milk and fruits. In Paris I used to drink French wine every day.

4. If you were in Berlin, in Germany, you would speak Ger-

man very soon. It would be necessary that you should know the language.

5. Washington died the fourteenth of December, seventeen hundred and ninety-nine [*do not use figures*], but his virtues still live.

6. I bought a black dog this morning, and am afraid he will do harm to my beautiful birds. No, I do not believe he has seen them.

7. You wish me to speak the truth. It is a beautiful thing, truth; it is worth more than money.

8. This afternoon we did not doubt that they would live until evening, and we sent for the physician, but he came too late.

9. Your sister is the most honest woman I know. She is the best friend you have, for she loves you enough to tell you your faults.

10. Is it certain that the French can make better silk than ours? Yes, but it is also certain that our pianos are better than theirs.

11. Here I am with the first flowers that I have received this spring. Have you any finer ones? No, the last I bought have been stolen.

12. This exercise is the most difficult we have had. It is very possible that we shall make mistakes in it, but I shall endeavor not to make any.

13. As soon as she had sold the new house, General B. entered and told her that he intended to remain there.

14. The women I saw killed were German, and the soldiers whom I heard fire (*tirer*) were French. Who made them do that?

Give the 2d pers. plur. pret., and 2d pers. sing. fut., and 3d pers. plur. pres. sub. of the following:

Pouvoir,	*Mourir,*	*Coudre,*
Vouloir,	*Naître,*	*Peindre,*
Venir,	*Moudre,*	*Vaincre,*
Courir,	*Resoudre,*	*Vivre.*

II.

Translate;

Renée. Et vous avez mûrement réfléchi aux conséquences?

Paul. Les conséquences sont faciles à déduire; je vivais seul

dans l'abandon, et désormais je vivrai en famille et dans l'opulence!

Renée. Et c'est ainsi que vous comptez relever la maison dont vous êtes l'unique espoir et le dernier soutien? Ce n'est pas assez de sa ruine, il vous plaît d'y joindre la honte! (*Elle se lève.*)

Paul (*se levant aussi*). Ah! ma cousine, si vous le prenez ainsi, nous ne pourrons jamais nous entendre. Il y a entre nous une révolution, un monde écroulé, un abîme . . . et nous ne parlons pas la même langue.

Renée. C'est tant pis pour vous, monsieur de Penarvan?

Paul. Et que m'importent les destinées de la maison de Penarvan? Est-ce que je la connais? qu'a-t-elle fait pour moi? Votre père, anticipant sur la mort, avait jugé plaisant de rayer le mien du nombre des vivants; vous, ma cousine, vous ne saviez pas même que je fusse de ce monde, et il a fallu qu'un hasard se chargeât de vous l'apprendre . . . Vous êtes accourue; pourquoi? pour rapprocher les débris de notre famille? pour m'apporter l'oubli du passé? Allons donc! Vous n'êtes venue que pour préserver cet illustre nom de la souillure d'une mésalliance . . . . une mésalliance pour vous, mais non pour moi, qui me fais gloire d'être de mon temps et ne suis d'ailleurs ni duc ni marquis.

XI. GERMAN.

Answer the questions, without translating the two following passages:

I.

Aber die Strömung wurde stärker; der Zinnsoldat konnte schon da, wo die Brücke aufhörte, den hellen Tag erblicken; allein er hörte auch einen brausenden Ton, der wohl einen tapferern Mann erschrecken konnte. Man denke nur; die Gasse mündete da, wo die Brücke endete, gerade in einen grossen Canal ein: das würde für ihn eben so gefährlich sein, als für uns einen grossen Wasserfall hinunterzufahren.

Nun war er schon so nahe dabei, dass er nicht mehr anhalten konnte. Der Kahn fuhr hinaus, der arme Zinnsoldat hielt sich so steif wie er konnte; Niemand sollte ihm nachsagen, dass er mit den Augen blinke. Der Kahn schnurrte drei, vier Mal herum, und war bis zum Rande mit Wasser gefüllt: er musste sinken! Der Zinnsoldat stand bis an den Hals im Wasser, und

tiefer und tiefer sank der Kahn, mehr und mehr löste das Papier sich auf; nun ging das Wasser über des Soldaten Kopf. Da dachte er an die kleine niedliche Tänzerin, die er nie mehr zu Gesicht bekommen sollte; und es klang vor des Zinnsoldaten Ohren:

"Fahre hin, o Kriegesmann!
Den Tod musst du erleiden!"

Nun ging das Papier entzwei, und der Zinnsoldat stürzte hinab—wurde aber augenblicklich von einem grossen Fisch verschlungen.

1. Give, with definite article, the nominative singular, genitive singular, and nominative plural of: *Tag* (2), *Wasserfall* (7), *Augen* (11), *Rande* (12), *Wasser* (13), *Papier* (14), *Soldaten* (15), *Tänzerin* (16), *Gesicht* (16), *Ohren* (18).

2. State to what class each of the following pronouns belongs, and if declinable, decline it, singular and plural: *der* (3), *Man* (4), *das* (6), *sich* (9), *Niemand* (10), *es* (17), *du* (20).

3. Decline, singular and plural: *that high tree*, *our older brother*, *black cloth*.

4. Compare: *high*, *large*, *brave*, *long*, *dark*, *warm*.

5. Give the principal parts of: *wurde* (1), *konnte* (1), *erschrecken* (4), *hinunterzufahren* (7), *anhalten* (8), *musste* (12), *stand* (13), *bekommen* (17), *klang* (17), *erleiden* (20).

6. Define clearly and fully a separable, and an inseparable compound verb.

7. State the uses of *sein*, *haben*, *werden*, *wollen*, as auxiliary verbs.

8. Give synopsis through all the tenses, in the indicative, subjunctive and conditional moods, active and passive voices, third person, singular number, of the verb *dachte* (15).

9. Write in German, or copy from the above passage, sentences illustrating the normal, the inverted, and the transposed order in a sentence.

10. What kind of subordinate sentence is introduced by *der* (3), *dass* (8), *dass* (10).

11. In what voice, mood, and tense, are *würde sein* (6), *war gefüllt* (12), *wurde verschlungen* (22)? *denke* (4), *blinke* (11), why subjunctive?

12. What is the syntax of *Wasserfall* (7), *hinunterzufahren* (7), *steif* (10), *Mal* (11), *Kriegesmann* (19).

II.

Noch sinnt er, ob Tod aus Feindes Hand,
Ob Tod in den Wogen er wähle.
Dann sprengt er vor an die Felsenwand,
Und befiehlt dem Herrn seine Seele;
Und näher schon hört er der Feinde Tross,
Aber scheu vor dem Abgrund bäumt sich das Ross;
Doch er spornt's, dass die Fersen bluten,
Und er setzt hinab in die Fluthen.

Und der kühne, grässliche Sprung gelingt,
Ihn beschützen höh're Gewalten;
Wenn auch das Ross zerschmettert versinkt,
Der Ritter ist wohl erhalten;
Und er theilt die Wogen mit kräftiger Hand
Und die seinen steh'n an des Ufers Rand
Und begrüssen freudig den Schwimmer.—
Gott verlässt den Muthigen nimmer.

1. State Grimm's Law, and show by a table the actual correspondence of mutes in English and German.

2. Point out *ten* words in the above passage with their English cognates.

3. Explain the derivation of the following words, and point out distinctly the force of each derivative element: *bäumt* (6), *setzt* (8), *Sprung* (9), *zerschmettert* (11), *Ritter* (12), *kräftiger* (13), *verlässt* (16), *nimmer* (16).

III.

Translate into German:

In a fine house lived a little boy, and this boy had some tin soldiers, which had been given him on his birthday. They were twenty-five in all, but they had only forty-nine legs, for one of them had to stand upon one leg, because the tin had not held out when he was made; but he was no less steadfast than the others who had two legs, and his history we will now read. The soldiers lay in a box, until the boy took them out and set them up upon the table. There they stood now, in their red and blue uniform, and each one held his musket on his arm.

IV.

Translate at sight:

Friedrich I. war ein Brudersohn Konrad III. Männliche Kraft und edle Schönheit zeichneten ihn aus. Seine Haut war weiss, seine Wangen roth. Wegen seines blonden Haares und Bartes wurde er Rothbart, und von den Italienern Barbarossa genannt. Aus seinen blauen Augen strahlte Milde und Wohlwollen; nur im Kampfe erglänzten sie, wie ein niederschmetternder Blitz. Sein Gang war fest, seine Stimme rein, sein Anstand männlich und würdevoll. In ritterlichen Uebungen stand er Keinem nach. Bei Festen war er heiter; doch hasste er ausschweifende Lustigkeit. Von Sitten war er einfach, von Gesinnung edel und grossmüthig, voller Achtung vor dem Gesetz und von Herzen gottesfürchtig. Er war klug und fest im Rath, stark und tapfer in der That, streng gegen Uebelwollende, herablassend gegen Niedere, leutselig gegen seine Freunde und in allen kriegerischen Werken der Erste. Seine gewaltige Macht beugte Dänemark und Polen. Unbestritten war er das Haupt der Christenheit. Gesandte aus Frankreich, England, Spanien und Italien huldigten ihm im Nahmen ihrer Fürsten. Gross war Deutschlands Herrlichkeit unter diesem Kaiser; nie war der deutsche Name mehr geachtet und gefürchtet; nie sahen die deutschen Gauen glänzendere Reichstage, als zu den Zeiten Barbarossa's.

XII. LATIN.

Caesar.

Translate (at sight):

Caesar exposito exercitu et loco castris idoneo capto, ubi ex captivis cognovit quo in loco hostium copiae consedissent, cohortibus x ad mare relictis et equitibus ccc, qui praesidio navibus essent, de tertia vigilia ad hostes contendit eo minus veritus navibus, quod in litore molli atque aperto deligatas ad ancoram relinquebat.—B. G. v. 9.

Give the reason for the mood and tense of *consedissent*, *essent;* for the case of *navibus* (before *essent*), *navibus* (before *quod*). Give the principal parts of *cognovit* and *veritus*, and inflect the former in the future indicative active, the latter in the imperfect subjunctive. What is the positive of the adverb *minus?*

VIRGIL.

Translate:

Haec sat erit, divae, vestrum cecinisse poetam,
Dum sedet et gracili fiscellam texit hibisco,
Pierides; vos haec facietis maxima Gallo,
Gallo, cuius amor tantum mihi crescit in horas,
Quantum vere novo viridis se subicit alnus.
Surgamus: solet esse gravis cantantibus umbra,
Iuniperi gravis umbra, nocent et frugibus umbrae.
Ite domum saturae, venit Hesperus, ite capellae.

ECL. x. 70–77.

Who was Gallus, and what his fate?

Where did pastoral poetry originate?

How is the tense of *venit* to be determined?

Translate:

Dixerat. Ille patris magni parere parabat
Imperio; et primum pedibus talaria nectit
Aurea, quae sublimem alis sive aequora supra
Seu terram rapido pariter cum flamine portant.
Tum virgam capit; hac animas ille evocat Orco
Pallentis, alias sub Tartara tristia mittit,
Dat somnos adimitque et lumina morte resignat.

AEN. iv. 238–244.

Who is *ille?* What is the special name of this *virga?* Explain the derivation of *imperio, talaria, rapido, flamine*, giving prefix, root, and ending employed to form the stem from the root, with the meaning of each of these parts.

Give the principal parts of *parere* and *parabat*, and mark the quantity of each syllable. Write out the last two verses above, dividing into feet and marking the caesuras, and give the rules for the length of all penultimate and final syllables. Indicate by English spelling the Roman pronunciation of the verse *dixerat*, etc.

CICERO.

[Take 1, if you have read the Archias, otherwise 2.]

1. *Translate:*

Nam si quis minorem gloriae fructum putat ex Graecis versibus percipi quam ex Latinis, vehementer errat, propterea quod Graeca leguntur in omnibus fere gentibus, Latina suis finibus, ex-

iguis sane, continentur. Quare si res eae, quas gessimus, orbis terrae regionibus definiuntur, cupere debemus, quo manuum nostrarum tela pervenerint, eodem gloriam famamque penetrare, quod cum ipsis populis, de quorum rebus scribitur, haec ampla sunt, tum iis certe, qui de vita gloriae causa dimicant, hoc maximum et periculorum incitamentum est et laborum. ARCH. 23.

What is the meaning of the indicative in the condition *si putat?*

What is the case of Archias? Under what special obligation was Cicero to his client?

2. *Translate:*

Quod si omnis impetus domesticorum hostium, depulsus a vobis, se in me unum converterit, vobis erit videndum, Quirites, qua condicione posthac eos esse velitis, qui se pro salute vestra obtulerint invidiae periculisque omnibus: mihi quidem ipsi quid est, quod iam ad vitae fructum possit adquiri, cum praesertim neque in honore vestro neque in gloria virtutis quidquam videam altius, quo mihi lubeat ascendere? Illud profecto perficiam, Quirites, ut ea, quae gessi in consulatu, privatus tuear atque ornem, ut, si qua est invidia conservanda re publica suscepta, laedat invidos, mihi valeat ad gloriam. CAT. iii. 28.

Of what kind is the condition *si verterit?* Explain the mood and tense of *lubeat?*

What two opinions were advocated in the senate (fourth oration) in regard to the punishment of the conspirators, and by whom were these opinions represented? Which did Cicero support?

Translate at sight:

[Sulla is accused by Torquatus, the son of a former rival, of complicity in the conspiracy of Catiline.]

Hic tu epistulam meam saepe recitas, quam ego ad Cn. Pompeium de meis rebus gestis et de summa re publica misi, et ex ea crimen aliquod in P. Sullam quaeris; et si furorem incredibilem biennio ante conceptum erupisse in meo consulatu scripsi, me hoc demonstrasse dicis, Sullam in illa fuisse superiore coniuratione. . . . . De quo etiam si quis dubitasset antea num id, quod tu arguis, cogitasset, interfecto patre tuo consulem descendere Kalendis Ianuariis cum lictoribus, sustulisti hanc suspicionem, cum dixisti hunc, ut Catilinam consulem efficeret, contra patrem tuum operas et manum comparasse. SULL. 67.

Explain the construction of *scripsi*, *dubitasset*, *descendere*, *biennio*.

Composition.

Translate into Latin:

When Cicero had condemned the opinion of the one and favored the opinion of the other, the senate voted as the consul desired. But if his friends had known what misfortune would sometime come to him in consequence of this victory, their* pity would perhaps have been as great as their envy.

History and Geography.

When and under whose leadership was the final victory gained which brought Greece under the power of Rome? For what other event is the same year memorable?

Sketch briefly the policy and course of Octavius from the arrival of the news of his uncle's death to the victory at Actium.

What was the principal immediate check provided against arbitrary action on the part of a consul, and what the principal remote check?

Give the situation of the following towns, countries, and rivers: Caudium, Iberus, Baetica, Pontus, Pharsalus, Numantia.

XIII. GREEK.

[N.B.—Write the Greek words *with their accents.*]

I. Prose.

Translate any *two* of the following three passages (of which it is not supposed that you have previously seen more than one), and answer *all* the questions.

1. *Οἱ δὲ Καρδοῦχοι ὁρῶντες ὀλίγους ἤδη τοὺς λοιπούς, πολλοὶ γὰρ καὶ τῶν μένειν τεταγμένων ᾤχοντο ἐπιμελησόμενοι οἱ μὲν ὑποζυγίων, οἱ δὲ σκευῶν, οἱ δὲ ἑταιρῶν, ἐνταῦθα δὴ ἐπέκειντο θρασέως καὶ ἤρχοντο σφενδονᾶν καὶ τοξεύειν. οἱ δὲ Ἕλληνες παιανίσαντες ὥρμησαν δρόμῳ ἐπ' αὐτούς· οἱ δ' οὐκ ἐδέξαντο· καὶ γὰρ ἦσαν ὡπλισμένοι, ὡς μὲν ἐν τοῖς ὄρεσιν, ἱκανῶς πρὸς τὸ ἐπιδραμεῖν καὶ φεύγειν, πρὸς δὲ τὸ εἰς χεῖρας δέχεσθαι οὐχ ἱκα-*

* Translate *they would perhaps have pitied him as much as envied him.*

νῶς. ἐν τούτῳ σημαίνει ὁ σαλπιγκτής· καὶ οἱ μὲν πολέμιοι ἔφευγον πολὺ ἔτι θᾶττον· οἱ δ' Ἕλληνες τὰ ἐναντία στρέψαντες ἔφευγον διὰ τοῦ ποταμοῦ ὅτι τάχιστα.

—Xen., *Anabasis*, IV, 3, 20.

Give the nom. acc. and gen. sing. of *σκευῶν, ὄρεσιν, χεῖρας*. Principal parts of *ὁρῶντες, ᾤχοντο, ἐπιδραμεῖν, φεύγειν*? On what root is *θᾶττον* formed and how? *Compare ὀλίγους, πολλοί.*

2. *Τοιούτων δὲ ὄντων, Θηραμένης εἶπεν ἐν ἐκκλησίᾳ, ὅτι, εἰ βούλονται αὐτὸν πέμψαι παρὰ Λύσανδρον, εἰδὼς ἥξει Λακεδαιμονίους πότερον ἐξανδραποδίσασθαι τὴν πόλιν βουλόμενοι ἀντέχουσι περὶ τῶν τειχῶν, ἢ πίστεως ἕνεκα. πεμφθεὶς δὲ διέτριβε παρὰ Λυσάνδρῳ τρεῖς μῆνας καὶ πλείω, ἐπιτηρῶν ὁπότε Ἀθηναῖοι ἔμελλον, διὰ τὸ ἐπιλελοιπέναι τὸν σῖτον ἅπαντα, ὅ τι τις λέγοι ὁμολογήσειν.*

—Xen., *Hellenica*, II, 2, 16 (Goodwin's Reader).

Decline *εἰδώς, πλείω* through the sing. Give the first ten cardinal numerals in Greek.

By whose advice were the Long Walls of Athens built? What purpose did they serve? By whom were they finally restored?

3. *Ἐναντία γε μὴν καὶ τάδε τοῖς ἄλλοις Ἕλλησι κατέστησεν ὁ Λυκοῦργος ἐν τῇ Σπάρτῃ νόμιμα. ἐν μὲν γὰρ δήπου ταῖς ἄλλαις πόλεσι πάντες χρηματίζονται ὅσον δύνανται· ὁ μὲν γὰρ γεωργεῖ, ὁ δὲ ναυκληρεῖ, ὁ δ' ἐμπορεύεται, οἱ δὲ καὶ ἀπὸ τεχνῶν τρέφονται· ἐν δὲ τῇ Σπάρτῃ ὁ Λυκοῦργος τοῖς ἐλευθέροις τῶν μὲν ἀμφὶ χρηματισμὸν ἀπεῖπε μηδενὸς ἅπτεσθαι, ὅσα δὲ ἐλευθερίαν ταῖς πολεσι παρασκευάζει, ταῦτα ἔταξε μόνα ἔργα αὐτῶν νομίζειν.*

—Xen., *Lacedaemonian Constitution*, VII, 1.

II. Composition.

[Most of the Greek words may be found in the second prose-passage above.]

The Athenians would not have sent Theramenes, if they had supposed that he would stay three months with Lysander. For they knew their provisions were likely to fail them in that time.

III. Poetry.

Translate:

Τοὺς δ', ὥστ' αἰπόλια πλατέ' αἰγῶν αἰπόλοι ἄνδρες
ῥεῖα διακρίνωσιν, ἐπεί κε νομῷ μιγέωσιν·
ὣς τοὺς ἡγεμόνες διεκόσμεον ἔνθα καὶ ἔνθα,
ὑσμίνηνδ' ἰέναι· μετὰ δέ, κρείων Ἀγαμέμνων,
ὄμματα καὶ κεφαλὴν ἴκελος Διὶ τερπικεραύνῳ,
Ἄρεϊ δὲ ζώνην, στέρνον δὲ Ποσειδάωνι.
ἠΰτε βοῦς ἀγέληφι μέγ' ἔξοχος ἔπλετο πάντων
ταῦρος· ὁ γάρ τε βόεσσι μεταπρέπει ἀγρομένῃσιν·
τοῖον ἄρ' Ἀτρείδην θῆκε Ζεὺς ἤματι κείνῳ,
ἐκπρεπέ' ἐν πολλοῖσι καὶ ἔξοχον ἡρώεσσιν.

—*Iliad*, II, 474–483.

Where formed (tense, mood, voice), and from what verbs, are *μιγέωσιν* and *ἀγρομένῃσιν*? Give their *Attic* forms.

Translate:

Δεύτερον αὖτ' Ὀδυσῆα ἰδών, ἐρέειν' ὁ γεραιός·
εἴπ' ἄγε μοι καὶ τόνδε, φίλον τέκος, ὅστις ὅδ' ἐστίν·
μείων μὲν κεφαλῇ Ἀγαμέμνονος Ἀτρείδαο,
εὐρύτερος δ' ὤμοισιν ἰδὲ στέρνοισιν ἰδέσθαι.
τεύχεα μέν οἱ κεῖται ἐπὶ χθονὶ πουλυβοτείρῃ,
αὐτὸς δέ, κτίλος ὥς, ἐπιπωλεῖται στίχας ἀνδρῶν·
ἀρνειῷ μιν ἔγωγε ἐΐσκω πηγεσιμάλλῳ,
ὅστ' οἰῶν μέγα πῶϋ διέρχεται ἀργεννάων.
Τὸν δ' ἠμείβετ' ἔπειθ' Ἑλένη, Διὸς ἐκγεγαυῖα·
οὗτος δ' αὖ Λαερτιάδης, πολύμητις Ὀδυσσεύς,
ὃς τράφη ἐν δήμῳ Ἰθάκης κραναῆς περ ἐούσης,
εἰδὼς παντοίους τε δόλους καὶ μήδεα πυκνά.

—*Iliad*, III, 191–202.

Explain the accent of *ὥς* (l. 6). Scan the last two lines.

THIRTEENTH ANNUAL COMMENCEMENT.

June 16, 1881.

I. THESES OF CANDIDATES FOR A BACCALAUREATE DEGREE.

1. James Stuart Ainslie—*Disquisition*—The Tendencies of our Time in Reference to Christianity.

2. Henry Wilson Battin—*Thesis in Civil Engineering*—The Albany Water Works Extension.

3. Gertrude Burt Harlow—*Oration*—The Dramatic Art.

4. Francis Marion Rites—**Thesis in Mechanic Arts*—The Compound Engine.

5. Henry Hiram Wing—**Thesis in Agriculture*—Experiments on the Quality of Milk as Affected by the Feeding of Apples.

6. George Schumm—**Political Essay*—Karl Heinzen, the Exponent of German Radicalism in America.

7. Parke Edmund Simmons—**Historical Essay*—The Prerogative and Influence of George III. in the Early Years of his Reign.

8. Will Sterling Ostrander—*Dissertation*—The Perpetuity of our Republic from the Diversity of its Component Elements.

9. Joseph Austin Holmes—*Essay*—Agricultural Labor in the Southern States.

10. Clara Louisa Teague—*Oration*—Physical and Moral Analogies.

11. Alice Goddard—**Essay*—The Mythic Dialect in Modern Poetry.

12. Jesse Edwin Read—**Thesis in Civil Engineering*—The Construction of Moles and Jetties.

13. William Isaac Hoag—**Thesis in Natural History*—The Masseter and Temporal Muscles in the Cat.

14. William Storey—**Thesis in Civil Engineering*—Wire Suspension Bridges.

15. William Ballard Hoyt—*Oration*—The Mediæval and the Modern Criminal Procedure.

16. Abram Rogers Bullis—**Thesis in Mathematics*—Solution of a Problem in Probabilities.

17. Robert Bertine Alling—**Dissertation*—Representation in Government.

18. Frank Harding—**Disquisition*—Revolutions and their Causes.

19. Otto Marc Eidlitz—**Thesis in Civil Engineering*—Review of the Cascadilla Bridge.

20. Theobald Smith—**Thesis in Philosophy*—The Peritoneum and its Principal Blood-vessels in the Felis Domestica.

21. Harriet Heyl—**Essay*—The Germans of the Nineteenth Century as Portrayed in their Novels.

22. George Lincoln Burr—*Oration*—Revolt and Revolution.

II. THESES OF CANDIDATES FOR A SECOND DEGREE.

1. William Datus Kelley, B.S.—*Design for an Arch over Cascadilla Gorge.

2. Charles Vernon Mersereau, B.C.E.—*The Repsold Base Measuring Apparatus.

3. Hosea Webster, B.S.—*The Mechanical Equivalent of Heat.

III. PRIZES AWARDED.

The Woodford Prize in Oratory.

———— ————

The Horace K. White Prizes in Veterinary Science.

The first to . . . . . Hidesabro Saze.
The second to . . . . . Theobald Smith.

IV. DEGREES CONFERRED.

Bachelors of Arts.

Ainslie, James Stuart,	Heyl, Harriet,
Burr, George Lincoln,	Hough, Romeyn Beck,
Carman, Frederick Douglass,	Hunter, Nathaniel Perry,
Concklin, Henry Sisson,	Place, Ira Adelbert,
Day, Harriet McHarg,	Simmons, Parke Edmund,
Flanigan, Walter Jerome,	Sommers, Harry Cantine,
Goddard, Alice,	Stearns, James Brainard,
Harkness, George Sumner,	Winegar, Harry Philips,
Harlow, Gertrude Burt,	Withington, Alfreda Bosworth.

Bachelors of Literature.

Ehrlicher, Frederick Matthias,	Gusdorf, Moses,
Gregory, Emily Lovira,	Neymann, Olga,

Putnam, Mary Chastina.

* Not read in public.

Bachelors of Philosophy.

Cheney, Miles Eugene,
Herrick, William Porter,
Hoyt, William Ballard,
Smith, Theobald.

Bachelors of Science.

In Science and Letters.

Alling, Robert Bertine,
Barnes, Justin Llewellyn,
Bowman, Seward Lincoln,
Campbell, Edwin,
Chapman, Edwin Lyon,
Clarke, Percy Edwards,
Collmann, John Saunders,
Copp, Fred Malin,
Dominick, DeWitt Clinton,
Fort, Phebe Irene,
Gardner, William,
Harding, Frank,
Hornor, Charles West,
Jayne, Delos Dan,
McArthur, William Corse,
Moses, Willis Holley,
Moulton, Guy,
Ostrander, Will Sterling,
Otis, Hanna Wood,
Palmer, Milton Cornelius,
Schumm, George,
Shinkel, John Newton Dexter,
Smith, Edward Sholl,
Smith, Raymond Lee,
Taylor, Oscar Livingstone,
Teague, Clara Louisa,
Van Pelt, Gertrude Wyckoff,
Vaughan, Edward Gilpin,
Wilson, Frank Thomas.

In Science.

Howland, Isabel,
Rich, Fred William,
Studley, Duane.

In Mathematics.

Bullis, Abram Rogers.

In Natural History.

Curtice, Fred Cooper,
Hoag, William Isaac.

Bachelors of Agriculture.

Bates, William Horatio,
Catchpole, Edwin Watson,
Hahn, Albert George Charles,
Holmes, Joseph Austin,
Kilborne, Fred Lucius,
Upton, Charles Olmsted,
Watson, George Catchpole,
Wing, Henry Hiram.

Bachelors of Civil Engineering.

Battin, Henry Wilson,
Eidlitz, Otto Marc,
Ferris, George Ferris,
McCrea, Clark Waldo,
Ormsby, Frank Worden,
Read, Jesse Edwin,
Storey, William,
Wick, Richard Brown,
Wightman, Willard Humphrey.

Bachelor of Mechanical Engineering.

Brown, William Clinton,
Rites, Francois Marion,
Thompson, Erwin William.

Master of Science.

Webster, Hosea.

Civil Engineers.

Kelley, William Datus, B.S.
Mersereau, Charles Vernon, B.C.E.

Licentiate Certificates.

Chittenden, Frank Hurlbut, (*Entomology*).
Wendell, Henry Ten Eyck, (*Architecture*).

Certificates.

In History and Political Science.

Biscoe, Helen Maria,
Shiras, George,
Simmons, Parke Edmund.

In the Medical Preparatory Course.

Gardiner, William Frederick,
Oatley, Eugene Lyman.

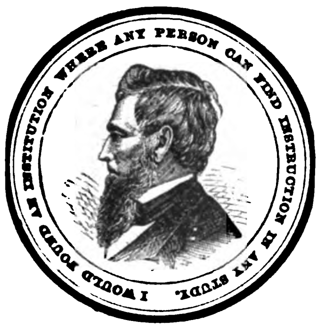
INDEX.

THE

CORNELL UNIVERSITY

REGISTER

1882-83



ITHACA, N. Y.

THE

CORNELL UNIVERSITY

REGISTER

1882-83

ITHACA, N. Y.

1883.	*Sunday.*	*Monday.*	*Tuesday.*	*Wedn'sd'y.*	*Thursday.*	*Friday.*	*Saturday.*	1883.	*Sunday.*	*Monday.*	*Tuesday.*	*Wedn'sd'y.*	*Thursday.*	*Friday.*	*Saturday.*
JAN.	..	1	2	3	4	5	6	**JULY**	1	2	3	4	5	6	7
	7	8	9	10	11	12	13		8	9	10	11	12	13	14
	14	15	16	17	18	19	20		15	16	17	18	19	20	21
	21	22	23	24	25	26	27		22	23	24	25	26	27	28
	28	29	30	31	..	..	..		29	30	31	..	..	..	..
FEB.	..	..	..	..	1	2	3	**AUG.**	..	..	..	1	2	3	4
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	11	12	13	14	15	16	17		12	13	14	15	16	17	18
	18	19	20	21	22	23	24		19	20	21	22	23	24	25
	25	26	27	28	..	..	..		26	27	28	29	30	31	..
MAR.	..	..	..	..	1	2	3	**SEP.**	..	..	..	..	..	..	1
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APR.	1	2	3	4	5	6	7	**OCT.**	..	1	2	3	4	5	6
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	29	30	..	..	..	..	..		28	29	30	31	..	..	..
MAY	..	..	1	2	3	4	5	**NOV.**	..	..	..	..	1	2	3
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JUNE	..	..	..	..	..	1	2	**DEC.**	..	..	..	..	..	..	1
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	10	11	12	13	14	15	16		9	10	11	12	13	14	15
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	24	25	26	27	28	29	30		23	24	25	26	27	28	29
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CALENDAR.

1882.		
Sept. 19–21,	Tuesday–Thursday,	Entrance Examinations.
Sept. 21,	Thursday,	Registration Day.
Sept. 22,	Friday,	Instruction begins.
Nov. 30,	Thursday,	Thanksgiving.
Dec. 18–22,	Monday–Friday,	Term Examinations.
Dec. 22,	Friday,	Term ends.
1883.		
Jan. 9–11,	Tuesday–Thursday,	Entrance Examinations.
Jan. 11,	Thursday,	Registration Day, Founder's Day.
Jan. 12,	Friday,	Instruction begins.
March 9,	Friday,	Woodford Prize Competition.
March 26–30,	Monday–Friday,	Term Examinations.
March 30,	Friday,	Term ends.
April 7,	Saturday,	Registration Day.
April 9,	Monday,	Instruction begins.
May 21,	Monday,	Commencement Essays due.
May 30,	Wednesday,	Theses for Adv. Degrees due.
June 4,	Monday,	Senior Examinations and Examinations for Advanced Degrees begin.
June 11–15,	Monday–Friday,	Term Examinations.
June 18–20,	Monday–Wednesday,	Entrance Examinations.
June 19,	Tuesday,	Class Day.
June 20,	Wednesday,	Alumni Day, Annual Meeting of the Trustees.
June 21,	Thursday,	Commencement.
Sept. 18–20,	Tuesday–Thursday,	Entrance Examinations.
Sept. 20,	Thursday,	Registration Day.
Sept. 21,	Friday,	Instruction begins.
Dec. 21,	Friday,	Term ends.

CONTENTS.

ORGANIZATION AND GOVERNMENT.

FOUNDATION OF THE UNIVERSITY.

The existence of Cornell University is due to the bounty of the United States and of Ezra Cornell. On the second of July, 1862, Congress passed an act granting public lands to the several states which should "provide at least one college where the leading object shall be, without excluding other scientific and classical studies, and including military tactics, to teach such branches of learning as are related to agriculture and the mechanic arts." Thirty thousand acres for each of its senators and representatives in Congress were appropriated to every state; and the share of the State of New York was nine hundred and ninety thousand acres in land scrip.

On the twenty-seventh of April, 1865, the legislature of New York incorporated "The Cornell University," appropriating to it the income arising from the sale of this land scrip. The most important conditions were, that Ezra Cornell should give to the University five hundred thousand dollars; that the University should give instruction in branches relating to agriculture, mechanic arts, and military tactics; and that it should receive, without charge for tuition, one student annually from each assembly district. Mr. Cornell fulfilled the first requirement of the charter, and made an additional gift of more than two hundred acres of land, with buildings, to be used as a farm in connection with the department of agriculture.

The act of incorporation satisfies the condition of the congressional grant by providing for instruction in such branches of learning as are related to agriculture and the mechanic arts, and in military tactics, "in order to promote the liberal and practical education of the industrial classes in the several pursuits and professions of life." And it further declares that "such other branches of science and knowledge may be embraced in the plan of instruction and investigation pertaining to the University, as the trustees may deem useful and proper."

The University, organized in accordance with the requirements of its charter, was opened on the seventh of October, 1868.

TRUSTEES.

The number of trustees, when the Board is full, is twenty-three. The eldest male lineal descendant of the Founder is, by the law of the State, a trustee, and seven others, the President of the University, the Governor of New York, the Lieutenant Governor, the Speaker of the Assembly, the Superintendent of Public Instruction, the President of the State Agricultural Society, the Librarian of the Cornell Library.

Of the remaining fifteen two are elected annually by the trustees and one by the alumni. The term of every trustee not *ex officio* is five years.

FACULTY.

The Faculty consists of professors, associate professors, and assistant professors, and is aided by non-resident professors and lecturers, and by instructors and examiners. It comprises the following special faculties: Agriculture; Architecture; Chemistry and Physics; Civil Engineering; History and Political Science; Ancient Classical Languages; Germanic Languages; Oriental Languages; Romance Languages; Mathematics; Mechanic Arts; Military Science; Natural History; Philosophy and Letters. The several special faculties constitute standing committees to which are referred questions relating to the departments under their control, but their action is subject to the approval of the general faculty.

STATE STUDENTS.

The ninth paragraph of the original act of incorporation provides for the admission of one student annually from each assembly district without payment of tuition. The number thus received, if all the scholarships were filled, would be five hundred and twelve. These State Students are to be selected, by yearly competitive examinations, from the various academies and public schools of the State. It is the duty of the school commissioners of counties and boards of education of cities to hold and conduct such examinations, and to award the scholarships. No applicant is allowed to compete who has been admitted to the University; and in order to enter it, the successful candidate is subject to the same requirements in regard to scholarship as any

other applicant. As the law requires the selection of "the best scholar," no distinction on account of sex is recognized in the competition. For further details regarding this subject see p. 100.

GRADUATE STUDIES.

For purposes of advanced study the University extends its privileges to its own graduates and to graduates of like standing from other colleges and universities, and it confers advanced degrees under conditions described elsewhere; but graduate students who are not candidates for a degree are received in any department, and for any length of time.

HIGHER EDUCATION OF WOMEN.

By an act of the trustees, passed in April, 1872, women are admitted to the University on the same terms as men, except that they must be seventeen years old. A separate building, the Sage College, has been erected and furnished for their residence. The entrance examinations and all the studies, except military science, are the same for women as for men.

RELIGIOUS SERVICES.

The University, established by a government which recognizes no distinction of religious belief, seeks neither to promote any creed, nor to exclude any. By the terms of its charter, persons of any religious denomination or of no religious denomination are equally eligible to all offices and appointments, and it is expressly ordered that "at no time shall a majority of the board of trustees be of any one religious sect, or of no religious sect."

In the University Chapel—the gift of the Hon. Henry W. Sage—religious services are held, and discourses delivered by representative clergymen of the various Christian denominations. The gentlemen named below are those invited to officiate during the academic year 1882–83:

UNIVERSITY PREACHERS, 1882-83
(On the Dean-Sage Foundation).

Oct. 1—President Noah Porter, D.D., LL.D., of Yale College.

Oct. 8—The Rev. Robert Collyer, D.D., of New York City.

Oct. 15—The Rt. Rev. Henry B. Whipple, D.D., Bishop of Minnesota.

Oct. 22—The Rev. Thomas K. Beecher, of Elmira, N. Y.

Oct. 29—President Ebenezer Dodge, D.D., of Madison University.

Nov. 5—The Rev. Lyman Abbott, D.D., of New York City.

Nov. 12—The Rev. William Everett, Ph.D., of Quincy, Mass.

Nov. 19—The Rev. Robert S. MacArthur, D.D., of New York City.

Nov. 26—The Rev. James H. Ecob, D.D., of Albany, N. Y.

Dec. 3—The Rev. John H. Vincent, D.D., of Plainfield, N. J.

Dec. 10—The Rev. William Rounseville Alger, D.D., of Portland, Me.

April 8—The Rt. Rev. Samuel Smith Harris, D.D., Bishop of Michigan.

April 15—The Rev. Joseph H. Twichell, of Hartford, Conn.

April 22—The Rev. John R. Paxton, D.D., of New York City.

April 29—President Atticus G. Haygood, D.D., of Oxford, Ga.

May 6—The Rev. Edward B. Coe, D.D., of New York City.

May 13—The Rev. George C. Lorimer, D.D., of Chicago, Ill.

May 20—The Rt. Rev. Bp. Matthew Simpson, D.D., of Philadelphia, Pa.

May 27—The Rev. Frederic H. Hedge, D.D., of Cambridge, Mass.

June 3—Professor John W. Churchill, D.D., of Andover, Mass.

June 10—The Rev. George R. Van De Water, of Brooklyn, N. Y.

June 17 (Baccalaureate Sermon)—The Rev. Joseph T. Duryea, D.D., of Boston, Mass.

BOARD OF TRUSTEES.

FACULTY.

ARRANGED, WITH THE EXCEPTION OF THE OFFICERS OF THE FACULTY, IN THE ORDER OF SENIORITY OF APPOINTMENT.

HON. ANDREW DICKSON WHITE, LL.D., University Grounds
PRESIDENT, *Professor of History.*

REV. WILLIAM DEXTER WILSON, D.D., LL.D., L.H.D., 109 Cascadilla
REGISTRAR, *Professor of Moral and Intellectual Philosophy.*

DANIEL WILLARD FISKE, A.M., Ph.D., University Grounds
LIBRARIAN, *Professor of North European Languages.*

GEORGE CHAPMAN CALDWELL, B.S., Ph.D., University Grounds
Professor of Agricultural and Analytical Chemistry, and Secretary of the Faculty.

BURT GREEN WILDER, B.S., M.D., 148 E. Buffalo St.
Professor of Physiology, Comparative Anatomy, and Zoölogy.

JAMES LAW, F.R.C.V.S., University Grounds
Professor of Veterinary Medicine and Surgery.

ALBERT NELSON PRENTISS, M.S., University Grounds
Professor of Botany, Horticulture, and Arboriculture.

JOHN LEWIS MORRIS, A.M., C.E., University Grounds
Sibley Professor of Practical Mechanics and Machine Construction.

THOMAS FREDERICK CRANE, A.M., University Grounds
Professor of the Romance Languages and Literatures.

CHARLES ASHMEAD SCHAEFFER, A.M., Ph.D., 103 E. Seneca St.
Professor of General and Analytical Chemistry, and of Mineralogy.

FREDERICK LOUIS OTTO RŒHRIG, Ph.D., M.D., University Grounds
Professor of Sanskrit and Living Asiatic Languages, and Assistant Professor of French.

HIRAM CORSON, A.M., LL.D., 58 Cascadilla
Professor of Anglo-Saxon and English Literature.

WATERMAN THOMAS HEWETT, A.M., Ph.D., 22 E. Buffalo St.
Assistant Professor of German.

BELA PHILLIPS MACKOON, A.M., University Grounds
Associate Professor of German.

LUCIEN AUGUSTUS WAIT, A.B., University Grounds
Associate Professor of Mathematics.

ISAAC FLAGG, Ph.D., University Grounds
Professor of the Greek Language and Literature.

CHARLES CHAUNCY SHACKFORD, A.M., University Grounds
Professor of Rhetoric and General Literature.

REV. CHARLES BABCOCK, A.M., University Grounds
Professor of Architecture.

JAMES EDWARD OLIVER, A.M., 69 Heustis St.
Professor of Mathematics

WILLIAM ARNOLD ANTHONY, Ph.B., 9 W. Buffalo St.
Professor of Physics and Experimental Mechanics.

ESTEVAN ANTONIO FUERTES, C.E., 170 E. State St.
Professor of Civil Engineering.

EDWIN CHASE CLEAVES, B.S., Cortland
Associate Professor of Freehand Drawing and Mechanical Drawing.

ISAAC PHILLIPS ROBERTS, M.Agr., University Grounds
Professor of Agriculture.

CHARLES LEE CRANDALL, C.E., 100 Hector St.
Assistant Professor of Civil Engineering.

IRVING PORTER CHURCH, C.E., 152 E. Seneca St.
Assistant Professor of Civil Engineering.

HORATIO STEVENS WHITE, A.B., University Grounds
Professor of the German Language and Literature.

JOHN HENRY COMSTOCK, B.S., University Grounds
Professor of Entomology and General Invertebrate Zoölogy.

WILLIAM RUSSELL DUDLEY, M.S., 108 Cascadilla
Assistant Professor of Botany.

JAMES BRATTLE BURBANK, Brevet Maj. 3d Art., U.S.A.,
Corner E. Seneca and Quarry Sts.
Professor of Military Science and Tactics.

GEORGE WILLIAM JONES, A.M., 17 Factory St.
Assistant Professor of Mathematics.

SAMUEL GARDNER WILLIAMS, A.M., Ph.D.,
Corner Green and Albany Sts.
Professor of General and Economic Geology.

HENRY SHALER WILLIAMS, Ph.D., 32 W. Green St.
Assistant Professor of Palaeontology.

WILLIAM RUFUS PERKINS, A.B., 142 E. Seneca St.
Assistant Professor of History.

GEORGE SYLVANUS MOLER, A.B., B.M.E., 156 N. Aurora St.
Assistant Professor of Physics.

WILLIAM GARDNER HALE, A.B., 100 Cascadilla
Professor of the Latin Language and Literature.

JOHN BURKITT WEBB, C.E., University Grounds
Professor of Applied Mathematics and Theoretical Mechanics.

SIMON HENRY GAGE, B.S., 149 Cascadilla
Assistant Professor of Physiology, and Lecturer on Microscopical Technology.

WILLIAM EDWARD LUCAS, Ph.B., 122 Cascadilla
Assistant Professor of Rhetoric and Composition.

CHARLES FRANCIS OSBORNE, 23 Quarry St.
Assistant Professor of Architecture.

MOSES COIT TYLER, LL.D., 135 E. Seneca St.
Professor of American History and Literature

SPENCER BAIRD NEWBURY, E.M., Ph.D., President White's
Assistant Professor of General Chemistry, Mineralogy, and Assaying.

HERBERT TUTTLE, A.M., 152 E. Seneca St.
Associate Professor of the History and Theory of Politics, and of International Law.

LECTURERS AND NON-RESIDENT PROFESSORS.

GOLDWIN SMITH, LL.D., L.H.D., Toronto, Canada
Lecturer on English Constitutional History.

RICHARD THEODORE ELY, Ph.D., Baltimore, Md.
Lecturer on Political Economy.

HENRY CARTER ADAMS, Ph.D., Ann Arbor, Mich.
Non-Resident Professor of Political Economy.

CHARLES KENDALL ADAMS, LL.D., Ann Arbor, Mich.
Non-Resident Professor of English Constitutional History.

INSTRUCTORS.

GEORGE LINCOLN BURR, A.B., 63 Eddy St.
Instructor and Examiner in Modern History.

FRED WILLIAM RICH, B.S., 31 Dryden Road
Instructor in Chemistry.

SAMUEL JACQUES BRUN, B.S., Osmond Place
Instructor in French.

JOHN CAREW ROLFE, A.B., Professor MacKoon's
Instructor in Latin.

FREDERIC REEVES LORING, S.B., 69 Heustis St.
Instructor in Chemistry.

WILLIAM HENRY CARPENTER, Ph.D., ———
Instructor in Rhetoric, and Lecturer on North European Literature.

OTHER OFFICERS.

WESLEY NEWCOMB, M.D., 23 Quarry St.
Curator of the Newcomb Collection of Shells, and Medical Examiner.

GEORGE WILLIAM HARRIS, Ph.B., 142 E. Seneca St.
Assistant Librarian.

ROMEYN BECK HOUGH, A.B., 126 E. Buffalo St.
Taxidermist, and Curator in Ornithology.

FRANK EUGENE FURRY, B.S., 97 Cascadilla
Chemist to the Agricultural Experiment Station.

BENJAMIN HERMON SMITH, Cortland
Director of the University Press.

GEORGE W. TAILBY, University Grounds
Foreman of the Farm.

MILES LORING CLINTON, 17 W. Buffalo St.
Foreman of the Machine Shop.

WILLIAM OGDEN KERR, 11 S. University Building
Meteorological Observer.

GOTTLIEB HUGO HOFFMANN, 26 S. University Building
Special Mechanical Assistant.

ALBERT FRANKLIN MATTHEWS, 43 N. University Building
Master of the Chimes.

ERNEST EMORY RUSSELL, 26 S. University Building
Janitor.

SPECIAL FACULTIES.

The President of the University is ex officio Chairman of each of the special faculties. In the absence of the President, the Secretary of the special faculty, whose name is printed first in the list of its members, is the acting Chairman.

AGRICULTURE—Professor ROBERTS, Professors CALDWELL, COMSTOCK, LAW, PRENTISS, and S. G. WILLIAMS.

ARCHITECTURE—Professor BABCOCK, Professors FUERTES, OLIVER, CLEAVES, and OSBORNE.

CHEMISTRY AND PHYSICS—Professor SCHAEFFER, Professors ANTHONY, CALDWELL, MOLER, and NEWBURY.

CIVIL ENGINEERING—Professor FUERTES, Professors ANTHONY, BABCOCK, MORRIS, OLIVER, SCHAEFFER, WEBB, CHURCH, and CRANDALL.

HISTORY AND POLITICAL SCIENCE—Professor A. D. WHITE, Professors TYLER, WILSON, PERKINS, H. C. ADAMS, and TUTTLE.

ANCIENT CLASSICAL LANGUAGES AND LITERATURES—Professor FLAGG and Professor HALE.

GERMANIC LANGUAGES AND LITERATURES—Professor FISKE, Professors H. S. WHITE, MACKOON, and HEWETT.

ROMANCE LANGUAGES AND LITERATURES—Professor CRANE and Professor RŒHRIG.

ORIENTAL LANGUAGES AND LITERATURES—Professor FISKE, Professors RŒHRIG and WILSON.

MATHEMATICS—Professor OLIVER, Professors ANTHONY, BABCOCK, FUERTES, MORRIS, WEBB, WAIT, and JONES.

THE SIBLEY COLLEGE OF MECHANIC ARTS—Professor MORRIS, Professors ANTHONY, BABCOCK, FUERTES, OLIVER, WEBB, and CLEAVES.

MILITARY SCIENCE AND TACTICS—Professor BURBANK and Professor WILSON.

NATURAL HISTORY—Professor PRENTISS, Professors COMSTOCK, LAW, WILDER, S. G. WILLIAMS, WILSON, DUDLEY, GAGE, and H. S. WILLIAMS.

PHILOSOPHY AND LETTERS—Professor SHACKFORD, Professors CORSON, WILSON, and LUCAS.

CATALOGUE OF STUDENTS.

GRADUATES.

Resident—Candidates for a Degree.

Brown, Ellen Coit, B.S., *History and Political Science*
Coe, Alfred Byron, B.S., *Civil Engineering*
Green, Robert Packer, B.C.E., *Civil Engineering*
Johnson, Anna Marilla, A.B., Vassar Coll. *Literature*
Johnson, George Henry, B.S., Rutgers Coll. *Mathematics*
Kephart, Horace, A.B., Lebanon Valley Coll. *History and Political Science*
Kilborne, Fred Lucius, Agr.B., *Veterinary Science*
Koopman, Harry Lyman, A.B., Colby Univ. *Germanic Languages and Literatures*
Peck, Ezra Jones, A.M., Williams Coll. *Classical Philology*
White, Andrew Curtis, A.B., Hamilton Coll. *Classical Philology*

Non-Resident—Candidates for a Degree.

Bissell, Esse Clarissa, B.S., *History and Literature*
Gusdorf, Moses, Lit.B., *History and Political Science*
Hahn, Albert George Charles, Agr.B., *Chemistry and Mineralogy*
Harlow, Gertrude Burt, A.B., *Ancient Classical Languages and Literatures*
Hill, Lena Lilian, B.S., *History and Political Science*
Howard, Leland Ossian, B.S., *Natural History*
Hunter, Nathaniel Perry, A.B., *History and Political Science*
Jayne, Delos Dan, B.S., *History and the German Language*
Johnson, Ben, B.M.E., *Mechanical Engineering*
Kendall, Franklin Mason, B.S., *History and Political Science*
Leary, Frank M., B.S., *History and Political Science*
Pitcher, Mary Merrill, A.B., *Ancient Classical Languages and Literatures*
Severance, Frank Hayward, B.S., *History and Political Science*
Tuthill, James Fred, A.B., *History and Political Science*
Webster, John Gurdon, B.S., *Natural History*

Whitney, Frank Curtis, A.B., *Ancient Classical Languages and Literatures*

Resident—Not Candidates for a Degree.

Carman, Frederick Douglass, A.B.,		*History and Political Science*
Cushing, Harry Platt, Ph.B.,		*Geology*
French, Charles Joseph, A.B., Yale Coll.		*Architecture*
King, David Woodbury, Arch.B.,		*Architecture*
McDowell, Clinton Byron, Ph.B., Alfred Univ.		*History and Political Science*
Putnam, Mary Chastina, Lit.B.,		*Botany*
Vinton, Maria Mitchell, A.B., Smith Coll.		*Medical Preparatory*
Watson, Essie Josephine, A.B., Smith Coll.		*Literature*
Wilson, James Meredith, Ph.B.,		*Natural History*
Withington, Alfreda Bosworth, A.B.,		*Chemistry and Natural History*

LICENTIATE.

Chittenden, Frank Hurlbut, *Chemistry*

UNDERGRADUATES.

Candidates for a Degree.

Seniors.

Alling, Asa Alling,	Bangall,	*Philosophy*
Anderson, Charles Henry,	St. Louis, Mo.,	*Literature*
Avery, Charles Irving,	Auburn,	*Science and Letters*
Avery, James Carrington,	Auburn,	*Science and Letters*
Beye, John Charles,	Elgin, Ill.,	*Engineering*
Booth, Irving Edward,	Rochester,	*Mechanic Arts*
Boulton, Jessie Mary,	Jamestown,	*Literature*
Bowen, Anna Cornelia,	Batavia,	*Arts*
Boyer, Lyman Fremont,	Freeport, Ill.,	*Science and Letters*
Brainard, George Austin,	Higganum, Conn.,	*Sc. and Letters*
Browning, Charles Ross,	Orange, N. J.,	*Hist. & Pol. Science*
Bullock, George,	Cincinnati, O.,	*Mechanic Arts*
Chase, Charles Curry,	Syracuse,	*Science and Letters*

Crooker, Edward Henry,	Minneapolis, Minn.,	*Literature*
Curtis, Charles Locke,	Newfield,	*Arts*
Cushing, Edward Fitch,	Cleveland, O.,	*Philosophy*
Diefendorf, Mary Riggs,	Brooklyn,	*Arts*
Dowling, Eunice,	Bradford,	*Arts*
Downing, Elizabeth,	Ithaca,	*Science and Letters*
Duryea, Edwin,	Craigsville,	*Engineering*
Dwellé, William Delafield,	Penn Yan,	*Arts*
Eaton, William Moser,	Ithaca,	*Philosophy*
Ehrman, Harry Friedman,	Decatur, Ill.,	*Science and Letters*
Elmer, Herbert Charles,	Rushford,	*Arts*
Ewing, William Bion,	Huntington, Ind.,	*Engineering*
Fuertes, James Hillhouse,	Ithaca,	*Engineering*
Hoffman, Harry Natt,	Elmira,	*Agriculture*
Holton, Frederick Arthur,	Washington, D.C.,	*Chem. & Physics*
Humphries, John Henry,	Syracuse,	*Literature*
Longwell, Harry Edgar,	Monongahela City, Pa.,	*Mech. Arts*
Lyon, John,	Schultzville,	*Science and Letters*
Mapes, Arlington,	Rushville,	*Philosophy*
Marshall, Holmes,	Cleveland, O.,	*Arts*
Matthews, Albert Franklin,	Orange, N. J.,	*Arts*
Maxwell, Emma Eliza,	North Clymer,	*Sc. and Letters*
McGraw, De Witt Hiram,	Binghamton,	*Arts*
Page, William Henry,	Stafford,	*Engineering*
Patterson, Roswell Henry,	Herrick Centre, Pa.,	*Sc. and Letters*
Payne, Lewis Taber,	Tonawanda,	*Science and Letters*
Pearson, Edward Jones,	Sedalia, Mo.,	*Engineering*
Place, Edwin,	Cincinnatus,	*Mechanic Arts*
Pratt, John Lovejoy,	Buskirk's Bridge,	*Literature*
Prentiss, Adaline Eldred,	Ithaca,	*Natural History*
Prentiss, Evarts Lincoln,	Penn Yan,	*Literature*
Preswick, Eugene Henry,	Ithaca,	*Science and Letters*
Prosser, Charles Smith,	Brookfield,	*Science*
Raynor, George Cartwright,	Riverhead,	*Science and Letters*
Reed, James William,	Warrensburg,	*Engineering*
Rhodes, Frances,	Trempealeau, Wis.,	*Architecture*
Roberts, Willis Markel,	Seneca Falls,	*Mechanic Arts*
Roehrig, Fred Lewis,	Ithaca,	*Architecture*
Ruggles, William Benjamin,	Bath,	*Mechanic Arts*

Runyon, Frank Willits,	Plainfield, N. J.,	*Literature*
Sheldon, Daniel Corydon,	Delphi,	*Engineering*
Smith, Clara Maria,	Palmyra,	*Literature*
Smith, Delano Eugene,	New York City,	*Sc. and Letters*
Smith, Herman Woodworth,	Trumansburg,	*Sc. and Letters*
Southwick, John Leonard,	Bombay,	*Hist. and Pol. Science*
Sullivan, Frank Robert,	Pompey Centre,	*Sc. and Letters*
Thayer, George Henry,	Plymouth, Ind.,	*Sc. and Letters*
Tinsley, Henry Greenwood,	Lyons,	*Science and Letters*
Turner, Ebenezer Tousey,	Ithaca,	*Engineering*
Washburn, Frank Sherman,	Chicago, Ill.,	*Engineering*
Wilcox, Fred Clarence,	Ithaca,	*Arts*
Wilcox, Fred Elmer,	Ithaca,	*Agriculture*
Woodruff, Cora Eliza,	Ithaca,	*Arts*

Juniors.

Aiken, George David,	Tioga, Pa.,	*Science and Letters*
Avila, Arao Ferreira de,	San Paulo, Brazil,	*Mechanic Arts*
Ayres, Philip Wheelock,	Villa Ridge, Ill.,	*Hist. & Pol. Science*
Bassett, Emma Neal,	Cooper's Plains,	*Philosophy*
Bering, Wilson Morrison,	Decatur, Ill.,	*Science and Letters*
Burrows, James Bering,	Decatur, Ill.,	*Science and Letters*
Carpenter, Fred Wisner,	Owego,	*Engineering*
Cassedy, William Fraser,	Newburg,	*Science and Letters*
Chisholm, Charles Fillmore,	Chazy,	*Philosophy*
Coimbra, Anastacio Rodrigues de Aquino,	Trez Ilhas, Brazil,	*Mechanic Arts*
Cole, Romaine Clark,	New York City,	*Engineering*
Coles, Franklin Albert,	Glen Cove,	*Science and Letters*
Collmann, Onnie Janssen,	Freeport, Ill.,	*Science and Letters*
Coman Charles Walter,	Kankakee, Ill.,	*Nat. History*
Cornell, Ida,	Central Valley,	*Sc. and Letters*
Cowles, Lewis Hutchinson,	Cleveland, O.,	*Science and Letters*
Curnow, George Trevilyan,	Brooklyn,	*Mechanic Arts*
Davidson, George Bruce,	Scranton, Pa.,	*Sc. and Letters*
De Forest, Harry Pelouze,	Fulton.	*Science and Letters*
Dietz, John Fanning,	Schoharie,	*Science and Letters*
Ditmars, George Ford,	Ovid Centre,	*Science and Letters*

Doubleday, Julia Louisa,	Binghamton,	*Philosophy*
Fish, Fred Starr,	Cedarville,	*Science and Letters*
Freeman, William Neely,	Sherburne,	*Arts*
Gambee, Linnie,	Fayette,	*Science and Letters*
Grotecloss, Hattie Elizabeth,	New York City,	*Natural History*
Grotecloss, John Hamilton,	New York City,	*Optional*
Hasbrouck, Charles Alfred,	Ithaca,	*Engineering*
Hettinger, Mathias,	Freeport, Ill.,	*Science and Letters*
Howard, William Turner,	New York City,	*Sc. and Letters*
Huffcut, Ernest Wilson,	Afton,	*Science and Letters*
Ingalls, Frank Percy,	Salem, Mass.,	*Chem. and Physics*
Kerr, Milton Royce,	Mongaup Valley,	*Science*
Krauss, William Christopher,	Attica,	*Science and Letters*
Lapham, Ludlow Eliakim,	Penn Yan,	*Arts*
Larned, William Henry,	Poland,	*Engineering*
Lewis, George Washington,	Buffalo,	*Arts*
Lillis, Thomas Francis,	Coventryville,	*Engineering*
Maguire, Edward,	Seward,	*Science and Letters*
McLoughlin, James,	New York City,	*Sc. and Letters*
Mead, Daniel Webster,	Rockford, Ill.,	*Engineering*
Monroe, Elmon,	Silver Creek,	*Arts*
Morse, Everett Fleet,	Algona, Iowa,	*Mechanic Arts*
Murphy, Edward Charles,	Phœnix,	*Engineering*
Oakes, Helen Mar,	Steuben,	*Science and Letters*
Patten, Henry Joyce,	Sandwich, Ill.,	*Hist. & Pol. Science*
Potter, Charles Anson,	Ithaca,	*Science and Letters*
Poucher, Warren Allen,	Oswego,	*Mechanic Arts*
Randolph, Cyrus,	Decatur, Ill.,	*Hist. & Pol. Science*
Robinson, Clarence Isaac,	Mt. Vision,	*Chem. and Physics*
Russell, Ernest Emory,	Havana,	*Hist. and Pol. Science*
Scofield, Frank Graham,	Fishkill,	*Engineering*
Shaler, Ira Alexander,	New York City,	*Engineering*
Shively, Harry Laurence,	Indianapolis, Ind.,	*Science*
Sibley, Herbert Delano,	Randolph,	*Arts*
Sprout, Helen Louise,	Brooklyn,	*Science and Letters*
Spurr, Marcia Edith,	South Edmeston,	*Sc. and Letters*
Stambaugh, John Tod,	Youngstown, O.,	*Hist. & Pol. Science*
Story, Elmer Gildersleeve,	Schultzville,	*Science and Letters*
Thorp, Charles Monroe,	Oil City, Pa.,	*Philosophy*

Tsumaki, Yorinaka,	Tokio, Japan,	*Architecture*
Tuthill, Lewis Henry,	Corning,	*Arts*
Van Ostrand, Byron Dean,	Marion,	*Science and Letters*
Walch, Charles John,	Syracuse,	*Science and Letters*
Ware, Richard,	Washington, D. C.,	*Optional*
Waring, John,	Ovid,	*Mechanic Arts*
Webb, Walter Loring,	Cortland,	*Engineering*
Weed, Oscar Dillwyn,	North Rose,	*Arts*
Welles, Nelson Ackley,	Elmira,	*Agriculture*
Williams, Timothy Shaler,	Ithaca,	*Arts*
Wilson, Charles Bundy,	Geddes,	*Arts*
Wyckoff, James Newton,	Perry,	*Science and Letters*

Sophomores.

Baker, Edward Everett,	Cedar Hill,	*Science and Letters*
Baker, Lester Arthur,	Olean,	*Agriculture*
Benedict, Frederick Staples,	Brockport,	*Architecture*
Bennett, Burton Ellsworth,	North Brookfield,	*Sc. and Letters*
Bickford, Chauncey Howard,	Belleville,	*Arts*
Bliss, Russell Joseph,	Peterboro,	*Philosophy*
Blood, Arthur Raymond,	Erie, Pa.,	*Engineering*
Boshart, Charles Fred,	Lowville,	*Agriculture*
Bostwick, Edward Hermon,	Ithaca,	*Science and Letters*
Boulton, Sadie Scott,	Jamestown,	*Science and Letters*
Brooks, Edgar Gerson,	Salt Lake City, Utah,	*Sc. and Letters*
Bull, Edward Leonard,	Slaterville,	*Science and Letters*
Bull, John, Jr.,	Slaterville,	*Science and Letters*
Burgess, Charles Otis,	Kelloggsville,	*Agriculture*
Chappell, Fred Martin,	Montezuma,	*Natural History*
Church, Wilmer,	High Falls,	*Mechanic Arts*
Clock, Cora May,	Ithaca,	*Science and Letters*
Cook, Russell Pardon,	Chillicothe, O.,	*Architecture*
Cooper, Edgar Howland,	New York City,	*Engineering*
Curtis, Charles Elbert,	Ithaca,	*Engineering*
Davenport, Mason Bosworth,	Varna,	*Science and Letters*
Dearstyne, Florence Evelyn,	Sandy Hill,	*Science and Letters*
Decker, Delbert Harvey,	Fulton,	*Philosophy*
Doolittle, Clarence Everett,	Washington, D. C.,	*Engineering*

Eidlitz, Robert James,	New York City,	*Architecture*
Eilshemius, Louis Michel,	Brooklyn,	*Agriculture*
Elliott, Orrin Leslie,	Centreville,	*Hist. and Pol. Science*
Falkenau, Harry,	Chicago, Ill.,	*Literature*
Fisher, Bertrand Hand,	Wellington, O.,	*Engineering*
French, Eldon Lewis,	Housatonic, Mass.,	*Mech. Arts*
French, James Benton,	New Hartford,	*Engineering*
Good, Arthur Carroll,	Buffalo,	*Science and Letters*
Hamp, Walter Francis,	Manchester, England,	*Engineering*
Harris, Rollin Arthur,	Jamestown,	*Engineering*
Hartzell, Albert Ankeny,	Buffalo,	*Science and Letters*
Hough, Elida Crofoot,	Lowville,	*Arts*
Kelley, Charles Lester,	Arcadia,	*Engineering*
Kellogg, Harry Whiting,	Shelburne, Mass.,	*Mechanic Arts*
Kittinger, George Bachelder,	Wilmington, Del.,	*Engineering*
Lain, David Emmet,	West Town,	*Mechanic Arts*
Lima, Casimiro Eugenio Amoroso,	Rio Janeiro, Brazil,	*Agriculture*
McCall, James,	Bath,	*Arts*
Merry, Martha,	Phœnix,	*Science and Letters*
Mosscrop, Alfred Mitton,	Brooklyn,	*Engineering*
Olin, Franklin Walter,	Buskirk's Bridge,	*Engineering*
Olmsted, Henry Collier,	Binghamton,	*Arts*
Penny, George Barlow,	Haverstraw,	*Science and Letters*
Powell, George Wilson,	Reed's Corners,	*Engineering*
Raht, Carl August,	Frisco, Utah,	*Engineering*
Sage, Adolphus Hiram,	South New Berlin,	*Sc. and Letters*
Seymour, Louis Hoard,	Ogdensburg,	*Science and Letters*
Seymour, Ralph Crysler,	Ogdensburg,	*Mechanic Arts*
Smith, Charles Henry,	New Haven,	*Mechanic Arts*
Smith, Jeannie Azilla,	Bath,	*Science and Letters*
Smith, Wilbur Hazelton,	Little Valley,	*Arts*
Smith, William Charles,	Bath,	*Engineering*
Snow, Benjamin Warner,	La Salle, Ill.,	*Chem. and Physics*
Snyder, Charles Earl,	Herkimer,	*Science and Letters*
Steere, Asel, Jr.,	South New Berlin,	*Sc. and Letters*
Stevens, Stoddard More,	Rome,	*Hist. and Pol. Science*
Stowell, William Mix,	Brighton,	*Mechanic Arts*
Towl, Forrest Milton,	Elmira,	*Engineering*
Van Sickle. John,	Cayuga,	*Science and Letters*

Veiga, Saturnino Ferreira da, Jr.,	Rio Janeiro, Brazil,	*Engineering*
Welby, Arthur Adlard,	Rio Janeiro, Brazil,	*Engineering*
Whaley, James Higgins,	Rome,	*Natural History*
White, Kate Tucker,	Utica,	*Science and Letters*
Willard, Julia Etta,	Watertown,	*Literature*

Freshmen.

Alexander, Charles Doster,	Prattville, Ala.,	*Sc. and Letters*
Austin, Ennis Raymond,	Owasco,	*Architecture*
Baker, Charles Hinckley,	Chicago, Ill.,	*Engineering*
Baker, Howard Winfield,	Chicago, Ill.,	*Engineering*
Barkley, Frank,	Port Jervis,	*Engineering*
Barney, William Grant,	Elmira,	*Science and Letters*
Barton, Philip Price,	Lock Haven, Pa.,	*Philosophy*
Barrows, Kate Magee,	Watkins,	*Science and Letters*
Beardsley, Harry Merchant,	Elmira,	*Arts*
Breed, Arthur Minier,	Big Flats,	*Agriculture*
Brodie, Hugh H.,	Woodville,	*Science and Letters*
Brunk, Thomas LaFayette,	Ottawa, Ill.,	*Science and Letters*
Cahill, Rose Hannah,	Binghamton,	*Optional*
Carolan, Herbert,	San Francisco, Cal.,	*Sc. & Letters*
Cassidy, Jessie Jane,	Brooklyn,	*Architecture*
Champion, Edward Willet,	Goshen,	*Natural History*
Chapman, Ernest Albert,	Groton,	*Science and Letters*
Charpiot, Henry Charles,	Denver, Col.,	*Engineering*
Converse, Frank Alvah,	Woodville,	*Agriculture*
Cornell, Ezra,	Ithaca,	*Engineering*
Couch, Lee,	Schoharie,	*Science and Letters*
Coville, Addison Luzerne,	Oxford,	*Science and Letters*
Crandall, Mary Elizabeth,	Owatonna, Minn.,	*Hist. & Pol. Science*
Curtis, Annie Neale,	Boston, Mass.,	*Sc. and Letters*
Darlington, William,	West Chester, Pa.,	*Mechanic Arts*
Day, William Asher,	Wilbraham, Mass.,	*Mechanic Arts*
Devin, Abe,	Des Moines, Iowa,	*Engineering*
Doud, Eli Horace,	Chicago, Ill.,	*Literature*
Dunham, Andrew Ellsworth,	Sauquoit,	*Science and Letters*
Dunham, Fredd Hall,	Johnsonsburg,	*Sc. and Letters*
Dusinberre, George Brown, Jr.,	Geneva,	*Mechanic Arts*
Dwyer, Kate Laura,	Syracuse,	*Optional*

Eacker, Lyman Brownell,	Silver Creek,	*Engineering*
Edwards, Kate May,	Cortland,	*Arts*
Ehle, Boyd,	Fort Plain,	*Engineering*
Eltinge, Maurice Wurts,	New Paltz,	*Science and Letters*
Emory, Arthur Theodore,	Unadilla,	*Arts*
Fitts, Fay Martin,	Dresserville,	*Optional*
Funck, Theodore,	Warrensburg, Mo.,	*Engineering*
Gadsby, Herbert Hume,	Gilbertsville,	*Arts*
Gilmore, Victor Lee,	New Iberia, La.,	*Agriculture*
Goddard, Harlow, 2d,	Richville,	*Optional*
Grant, Arthur Hastings,	New York City,	*Engineering*
Gray, Macomb Byron,	Cape Vincent,	*Sc. and Letters*
Gunner, Daniel Webster,	Schaghticoke,	*Engineering*
Hagadorn, Charles Baldwin,	Elmira,	*Engineering*
Haggert, Roderick Sinclair,	Brampton, Canada,	*Mech. Arts*
Harrison, Joseph La Roy,	North Adams, Mass.,	*Sc. & Letters*
Hathaway, Alvin Elmer,	Decatur, Mich.,	*Agriculture*
Hawley, Abraham Lincoln,	Taylor,	*Engineering*
Hill, Robert Thomas,	Comanche, Texas,	*Nat. History*
Hinman, Delon Marcus,	Denver, Col.,	*Engineering*
Hoffeld, Henry Rudolph,	Lancaster,	*Engineering*
Howell, Jenny Kirk,	Painted Post,	*Science and Letters*
Hull, Charles Henry,	Ithaca,	*Literature*
Hyatt, Louis Eugene,	Lansingburg,	*Hist. & Pol. Science*
Illston, Henry Benjamin,	Ithaca,	*Mechanic Arts*
Ingalls, Owen Lovejoy,	Peterboro,	*Engineering*
Kaley, Patrick Frank,	Manlius,	*Science and Letters*
Kelley, Ellen Louise,	Newark,	*Optional*
Kittredge, Helen,	New York City,	*Sc. and Letters*
Le Fevre, Josiah Philip,	Gardiner,	*Science and Letters*
Lighthall, William Sackett,	Syracuse,	*Science and Letters*
Lima, Elias David Abinun de,	New York City,	*Sc. and Letters*
Loeser, Abraham,	Buffalo,	*Agriculture*
Lorber, Lewis James Edward Joseph,	Ithaca,	*Arts*
Maguire, James Patrick,	Chateaugay,	*Engineering*
McCann, George,	Elmira,	*Science and Letters*
Merritt, Ernest George,	Indianapolis, Ind.,	*Science*
Mooney, Margaret Elizabeth,	Ithaca,	*Science and Letters*
Nef, John Jacob,	Housatonic, Mass.,	*Mech. Arts*

Newton, Frank Merrick,	Homer,	*Science*
Newton, Samuel Luther,	Big Rapids, Mich.,	*Optional*
Norton, Algernon Sidney,	Cortland,	*Arts*
Nourse, Sarah Cornelia,	Ithaca,	*Science and Letters*
Noxon, Gardiner James,	Ithaca,	*Mechanic Arts*
Packard, Allyn Augustus,	St. Louis, Mo.,	*Architecture*
Patterson, Webster,	Wilmington, Del.,	*Mech. Arts*
Payntar, Mary Helen,	Ferguson's Corners,	*Arts*
Pearce, Otis Ezra,	North Hannibal,	*Architecture*
Perkins, Albertus Delos,	Little York,	*Arts*
Perkins, Elma E.,	Addison Hill,	*Agriculture*
Pickard, Jay Eugene,	Fort Plain,	*Engineering*
Pierce, Charles Hopkins,	Forestville,	*Engineering*
Pierce, George Henry,	Branchport,	*Architecture*
Ransom, Charles Wellington,	Ellenburg,	*Science and Letters*
Rider, Ora Putnam,	Parish,	*Optional*
Riley, William Herman,	Wilmington, Del.,	*Mech. Arts*
Roberts, James Henry,	Windsor,	*Arts*
Romney, Joseph Mac Auslin,	Salt Lake City, Utah,	*Sc. & Letters*
Runner, Emma Avaline,	Ithaca,	*Science and Letters*
Russell, Herbert Halsey,	Addison,	*Agriculture*
Russell, Isaac Howard,	Castile,	*Optional*
Rutledge, Arthur,	Rockford, Ill.,	*Engineering*
Ryder, Stephen,	Carmel,	*Science and Letters*
Sackett, John Thompson,	Brooklyn,	*Science and Letters*
Schaaf, Rudolph George,	Newark, N. J.,	*Engineering*
Seely, Florence Corinne,	Rochester,	*Literature*
Seymour, John Pliny,	Ogdensburg,	*Mechanic Arts*
Sheldon, Frank Warren,	Hoboken, N. J.,	*Mechanic Arts*
Shepard, Frank William,	Medina, O.,	*Engineering*
Sloan, Fred,	Worcester,	*Science and Letters*
Smith, Eva Anna,	West Winfield,	*Sc. and Letters*
Sprague, Danly Darius, Jr.,	Holley,	*Engineering*
Stanbrough, Lyman Truman,	Owego,	*Optional*
Stoner, Stanley,	Griggsville, Ill.,	*Sc. and Letters*
Story, Charles Butts,	Schultzville,	*Science and Letters*
Summers, Henry Elijah,	Rochester,	*Science and Letters*
Sweet, Glen Morris,	Phœnix,	*Optional*
Sweet, Joseph Ferris,	Throop,	*Optional*

Taylor, Hobart Chatfield,	Chicago, Ill.,	*Science and Letters*
Thurber, Charles Herbert,	Deckertown, N. J.,	*Sc. & Letters*
Tyler, Edward,	Ithaca,	*Science and Letters*
Vischer, William Bentley,	Wellington, O.,	*Sc. and Letters*
Warren, Andrew Wight,	Jamestown,	*Engineering*
Webster, William Elmer,	Eden Valley,	*Science and Letters*
Weil, Alphonse David,	San Francisco, Cal.,	*Sc. & Letters*
White, Charles David,	Marion,	*Natural History*
Wheeler, Fred Russell,	Buffalo,	*Science and Letters*
Wightman, Edward Daniel,	Eden,	*Mathematics*
Wing, Charles Benjamin,	Willow Brook,	*Engineering*
Wood, Phœbe Jane,	Portville,	*Science and Letters*

Optional and Special Students.

Not Candidates for a Degree.

Aldrich, Herbert Lincoln,	Northborough, Mass.,	*Optional*
Beidler, Herbert Alpine,	Chicago, Ill.,	*Optional*
Carr, James Stewart,	East Bloomfield,	*Hist. & Pol. Science*
Case, Howard Emmet,	Fulton,	*Optional*
Cobb, Alice Ellen,	Andover,	*Optional*
Collins, Edward Hiram,	Syracuse,	*Optional*
Corlew, Lottie Trumbull,	Cortland,	*Optional*
Dodd, Eugene Emmett,	Index, Mo.,	*Optional*
Dowling, Jonathan Lockwood,	Bradford,	*Optional*
Durand, Fred Coye,	Westfield,	*Optional*
Fitzgerald, Hattie,	Monroe,	*Optional*
Fisher, Harley Wilson,	Oil City, Pa.,	*Special, Hist. & Pol. Sc.*
Genung, Albert Smith,	Ithaca,	*Optional*
Green, Dudley Tyng,	Homer,	*Special, Hist. & Pol. Sc.*
Green, William Clinton,	Rochester,	*Special, Architecture*
Haldeman, Frank Mackenzie,	Cleveland, O..	*Special, Chem.*
Hall, Charles Lee,	Canisteo,	*Optional*
Holman, Sidney Smith,	Bolton, Mass.,	*Optional*
Hubbard, Walter Stacy,	Portville,	*Hist. & Pol. Science*
Ingham, Francis Horton,	La Porte, Pa.,	*Hist. & Pol. Science*
Jones, Charles Sumner,	Middlesex,	*Optional*
Law, John Edwin,	Ithaca,	*Med. Preparatory*
Lay, William Russell,	Oil City, Pa.,	*Special, Arch.*

Lester, Ordelia Amanda,	Oswego,	*Special, Lit. and History*
McCaw, Will,	Varick,	*Med. Preparatory*
McGinley, Arthur Kingsley,	Portsmouth, N. H.,	*Optional*
Merwin, Milton Knapp,	Utica,	*Special, Mechanic Arts*
Mitchell, Delbert,	Troy, Pa.,	*Special, Vet. Science*
Nettleton, George William,	Medina, O.,	*Special, Architecture*
Park, Charles Caldwell,	Alleghany City, Pa.,	*Optional*
Percival, Francis Rollin,	Somers, Conn.,	*Med. Preparatory*
Reed, Edward Charles,	San José, Cal.,	*Optional*
Ridge, Daniel Wamsley,	Bustleton, Pa.,	*Hist. & Pol. Science*
Shepard, Pauline Wood,	Medina, O.,	*Optional*
Smith, Chester Mansfield,	Baltimore, Md.,	*Optional*
Smith, Fred Bigelow,	Tioga, Pa.,	*Special, Chemistry*
Swartwout, Henry B.,	Huguenot,	*Optional*
Upton, Wallace Lincoln,	Clymer,	*Special, Mechanic Arts*
Waldo, Jessie,	Scotland, Ct.,	*Optional*
Wallenbeck, Nancy,	Enfield,	*Special, Draughting*
Wheeler, Amos,	Ithaca,	*Optional*
Yawger, John Francis,	Union Springs,	*Optional*

SUMMARY.

GRADUATES,		36
LICENTIATE,		1
UNDERGRADUATES,		
Seniors,	66	
Juniors,	72	
Sophomores,	68	
Freshmen,	122	
Optional and Special,	42	
		370
Total,		407

ADMISSION.

ENTRANCE EXAMINATIONS.

The Primary Examination for Admission to the University.

All candidates for admission, except those provided with certificates or diplomas as specified below, are examined as follows:

1. In *English Grammar;* Whitney's Essentials of English Grammar is the standard. A short composition is required as a test of the candidate's knowledge of spelling, punctuation, the use of capitals, and elementary English construction.

At the option of the candidate the subject for this composition will be assigned by the examiner from one of the books named below, and the knowledge of the subject matter shown will be duly regarded.

In 1883: Shakespeare's Julius Caesar, Bunyan's Pilgrim's Progress, Scott's Ivanhoe, Gray's Elegy.

In 1884: Shakespeare's Coriolanus, Thackeray's Henry Esmond, Irving's Sketch Book, Longfellow's Evangeline.

In 1885: Shakespeare's Merchant of Venice, Scott's Lady of the Lake, Hawthorne's Twice Told Tales, Lowell's Vision of Sir Launfal.

2. In *Geography*, political and physical; as much as is contained in Harper's School Geography, or in Warren's Common School Geography.

3. In *Physiology;* as presented in the smaller text-books upon the subject, exclusive of the nervous system and the names of bones and muscles.

4. In *Arithmetic*, including the metric system of weights and measures; as much as is contained in the larger text-books.

5. In *Plane Geometry;* as much as is contained in the first five books of Chauvenet's Treatise on Elementary Geometry, or in the first five books of Wentworth's Elements of Plane and Solid Geometry, or in the first six books of Newcomb's Elements of Geometry, or in the first six books of Hamblin Smith's Elements of Geometry.

6. In *Elementary Algebra*, through quadratic equations, and including radicals and the theory of exponents; as much as is contained in the first fourteen chapters of Loomis' Treatise on Algebra, or in Olney's Elementary Course in Algebra, or in the first

five sections of Robinson's University Algebra, or in the first twenty-six chapters of Hamblin Smith's Elementary Algebra.

In Arithmetic, and in the fundamental operations of Algebra, such as multiplication and division, the management of brackets, the solving of numerical and literal equations of the first and second degree, the combining and simplifying of fractions and radicals, the interpretation and use of negative quantities and of 0 and ∞, the putting of problems into equation—the student should have distinct notions of the meaning and the reason of all that he does, and be able to state them clearly in his own language; he should also be able to perform all these operations, even when somewhat complex, with rapidity, accuracy, and neatness; and to solve practical problems readily and completely. In his preparatory study he is advised to solve a great many problems, and to state and explain the reasons for the steps taken. In Geometry he should learn the definitions accurately, whether in the language of the text-book or not, and in proving a theorem or solving a problem he should be able to prove every statement made, and to go back step by step till he rests upon the primary definitions and axioms. He should be able to apply the principles of geometry to practical and numerical examples, to construct his diagrams readily with rule and compass, and to find for himself the solutions of simple problems and the demonstrations of simple theorems. Besides oral recitation he is advised to write out his demonstrations, having equal regard to the matter and to the form of his statements; and when written he may carefully study them to make sure, first, that he has a complete chain of argument, and, secondly, that it is so arranged that without defect or redundance one step follows as a logical consequence of another.

In place of these examinations certain certificates or diplomas are received as follows:

1. *Certificates* issued by the *Regents of the University* of the State of New York are accepted in place of the examinations in English Grammar, Geography, and Arithmetic.

2. *Certificates* issued by the *Superintendent of Public Instruction* of the State of New York, and *Diplomas* issued by the state normal schools, and by those academies and high schools of the State of New York whose requirements for graduation have

been approved by the Faculty, and whose course of study requires Physiology and Plane Geometry, are accepted in place of the examinations in all the subjects named above *except Algebra.*

3. *Diplomas* issued by the *Regents* to graduates from the high schools and academies of the State of New York are accepted in place of the examinations in all the subjects named above.

Candidates must be of good moral character and at least *sixteen* years of age, or, if women, *seventeen.*

Examinations for Admission to the Several Courses.

The requirements for admission to the courses in *Agriculture*, *Architecture*, *Civil Engineering*, and *Mechanic Arts*, are the same as those for admission to the University; but for admission to any of the other regular courses of study, the examinations, *in addition to the Primary Examination*, are as follows:

To the Courses in Science, Science and Letters, Mathematics, Chemistry and Physics. and Analytical Chemistry.

In addition to the Primary Examination, an examination in *any one* of the following subjects:

1. In *French*, the principles of French Grammar, the translation of French at sight, the translation of English into French, and the equivalent of two of Bôcher's modern French plays and Lacombe's Petite Histoire du Peuple Français;

2. In *German*, the whole of Whitney's German Grammar, the translation of German at sight, the translation of English into German, and one hundred pages of Whitney's Reader, including two of the longer prose extracts or an equivalent;

Any deficiency in the preparatory French or German may be made up, as extra work, by reciting with the regular classes in the University.

3. In *Mathematics*, Solid Geometry and Conic Sections, as much as is contained in Newcomb's Elements of Geometry; Advanced Algebra, as much as is contained in Olney's University Algebra, or in Newcomb's Algebra; and Trigonometry, Plane and Spherical, as much as is contained in Wheeler's Elements of Trigonometry, or in the unstarred portions of Oliver, Wait, and Jones' Treatise on Trigonometry.

To the Course in Natural History.

In addition to the Primary Examination, as follows:

1. In *French* or *German*, as above.

2. In *Plane Trigonometry*, as above.

3. In *Latin*, four books of Cæsar's Commentaries or an equivalent, with a good knowledge of the grammar.

4. In *Greek*, the alphabet and enough of the language to enable the student to recognize, analyze, and form scientific technical terms.

To the Two-Year Course Preparatory to the Study of Medicine.

In addition to the Primary Examination, as follows:

1. In *Plane Trigonometry*, as above.
2. In *Latin*, as above.
3. In *Greek*, as above.

To the Courses in Literature, Philosophy, and History and Political Science.

In addition to the Primary Examination, as follows:

1. In *French* or *German*, or *Mathematics*, as above.
2. In *Latin*, as below.
3. In *Grecian* and *Roman History*, as below.

To the Course in Arts.

In addition to the Primary Examination, as follows:

1. In *Greek*, candidates are expected to have read at least one hundred pages of Attic prose, and three books of Homer: they are examined (1) critically on what they have read; (2) in translating easy Greek at sight; and (3) in translating English into Greek.

2. In *Latin*, candidates are examined (1) in the following authors, with questions on subject-matter, constructions, and the formation and inflection of words: Cæsar, four books of the Gallic war, Virgil, the Eclogues and six books of the Æneid, with the prosody, Cicero, six Orations, including the four against Catiline; (2) in the translation at sight of passages of average difficulty from Cæsar and Cicero; and (3) in the translation into Latin of a piece of connected English based upon the principles and vocabulary contained in the first forty lessons of Allen's Introduction to Latin Composition.

3. In *Grecian and Roman History*, and the outlines of ancient geography; Fyffe's Primer of Greece, Creighton's Primer of Rome, and Tozer's Primer of Classical Geography will indicate the amount and method of study desired.

SPECIAL STUDENTS.

Any person at least twenty-one years of age, and having satisfactory attainments, may be admitted by vote of the Faculty, without examination, as a special student, on the recommendation of the professor in charge of any department in which he is to take a large part of his work. This admission must be renewed every year. Such students cannot be candidates for a degree or licentiate certificate.

ADMISSION TO ADVANCED STUDIES.

Candidates for admission to advanced studies in any course are required to pass, *in addition to the entrance examinations* for that course, examinations in the work already performed by the classes which they design to enter.

CANDIDATES FROM OTHER COLLEGES.

Certificates of honorable dismissal from other colleges are received in place of the *Primary Examination* only, and when offered by candidates who *have passed at least one term's examinations* at the institution granting such dismissal. No person, whether from another college or not, is admitted to *advanced studies* except after examination as above stated.

ADMISSION TO GRADUATE STUDY.

Students are admitted to graduate study after having taken a baccalaureate degree in this University, or on presenting the diploma of an equivalent degree conferred elsewhere; they are at liberty to attend lectures, recitations, or other exercises of undergraduates, and to use the library, museums, etc. They are expected to pursue some study of advanced character under the direction of a professor or of a special faculty.

DEPARTMENTS AND SPECIAL COURSES OF STUDY.

AGRICULTURE.

I. APPLIED AGRICULTURE.

The requirements for admission to the course in Agriculture are such as to put the advantages which it offers within the reach of every young man who has made good use of the instruction afforded in the public schools. The instruction is given by lectures and recitations, illustrated with the aid of the Auzoux models and various other collections belonging to the University. Besides the class-room exercises, the student devotes as much time as can be spared to practice in the botanical, chemical, and veterinary laboratories, as well as in the fields and barns.

In Applied Agriculture five hours a week, during the senior year, are devoted to technical instruction in all its leading and most of its minor branches. The student is also required to spend three hours a day, two days in each week, in field work, and in the handling and feeding of domestic animals; and if this amount of practice does not prove sufficient to make him familiar with the various operations of the farm, additional time is required during the summer vacation.

The instruction by lectures begins with the senior year, and continues through the three terms of that year.

Fall Term: Wheat—culture, varieties, preparation of the soil, seeding, injurious insects, harvesting, threshing, marketing; Swine—the history of breeds, feeding, general management, piggeries; Farm Buildings—location, plans, material, construction, repairs and preservation, contracts, liabilities of contractors; Fields—shape and size; Fences and Gates—construction, number, kind, repairs, durability of woods used; Farm and public roads, bridges, and culverts—location, construction, repairs; Farms—selection and purchase with regard to remoteness or nearness to markets, agricultural capabilities, roads, improvements, schools and society; Titles, deeds, judgments, and mortgages; Farm-Yard Manures—composition, manufacture, preservation, application; Commercial Fertilizers—composition, application, utility.

Winter Term: Farm Accounts; Principles of Stock-breeding—law of similarity, of variation as caused by food, habit and climate, atavism, relative influence of male and female, prepotency, sex, in-and-in breeding, crossing and out-crossing, grading up or breeding in line; Races and Breeds—pedigrees, leading breeds of neat animals treated as to history, markings, characteristics, and adaptation to uses, soil, climate, and locality; Breeding, feeding, and management of cattle; Butter, cheese, and milk dairies, and beef production; Sheep Husbandry treated in detail same as cattle.

Spring Term: The Horse—breeds and breeding, education, care, driving, stables; Farm Drainage—mapping of drains, material, construction, utility; Plows and plowing; Farm Implements and Machinery—use, care, and repairs; Corn, oat, barley, and flax culture; Grasses and forage plants; Weeds and their eradication; Business customs, rights, and privileges; Notes, contracts, and obligations; Employment and direction of laborers.

University Farm.

The Farm consists of 120 acres of arable land, the larger part of which is used for experimental purposes and the illustration of the principles of agriculture. Nearly all the domestic animals are kept to serve the same ends. Those portions of farm and stock not used for experiments are managed with a view to their greatest productiveness. Statistics of both experiments and management are kept on such a system as to show at the close of each year the profit or loss not only of the whole farm but of each crop and group of animals. Of the two barns with which the farm is equipped, one is largly devoted to the needs of the Horticultural Department; the other, containing steam-engine, feed-cutter, stationary thresher, and other necessary appliances, furnishes accommodation for the general crops and stock, and for experimental work.

II. AGRICULTURAL CHEMISTRY.

The study of Agricultural Chemistry comprises lectures and analytical practice in the laboratory. The lectures, seventy-five in number, embrace the following general subjects:

The general principles of chemical science, accompanied by in-

troductory laboratory work; the chemistry of the elements and their compounds that constitute soils, plants, and animals; investigators in agricultural chemistry, their methods and means of working, and the literature of agricultural chemistry; the chemistry of vegetable life, and the production of vegetable substance in general; the physical and chemical properties and agricultural resources of the soil; tillage, drainage, etc., and amendments and manures; the composition of crops and other materials used for fodder; animal chemistry and nutrition; fermentation and putrefaction; milk and its manufactured products and residues; food, water, and air in their relations to human and animal life; the chemical analysis of fodder and food; farm crops and their manufactured products and residues.

The analysis of agricultural materials and products is treated in a course of chemical practice, as described under the head of Analytical Chemistry, page 56.

III. ECONOMIC ENTOMOLOGY.

Twenty lectures are given in the spring term.

The course presents the characteristics of the orders of insects, the more important families, and the species which are injurious, beneficial, or otherwise especially interesting. The lectures are illustrated by specimens of the stages and works of insects, and due prominence is given to the practical treatment of forms having an economic importance.

In the laboratory and field practice students are instructed in all kinds of practical entomological work, involving drawings and notes of observations, with methods of collecting, breeding, destroying, preserving, arranging, etc.

Entomological Cabinet and Laboratory.

The entomological cabinet contains, in addition to many exotic insects, specimens of a large proportion of the more common species of the north-eastern United States. These specimens are arranged in two collections: one biological, containing specimens illustrative of the metamorphoses and habits of insects; the other systematic, in which the species are arranged so as to show their zoölogical affinities.

The Laboratory is equipped with a set of Auzoux models, microscopes, breeding cages, and other apparatus necessary for practical work in entomology.

IV. HORTICULTURE.

The instruction comprises two courses of lectures during the fall term, supplemented by experimental or practical work.

Junior Year: A course of lectures upon arboriculture and landscape gardening.

Senior Year: A course of lectures upon the principles of horticulture.

Additional time is given to experimental work in the garden or conservatories. The instruction in botany, both in the laboratory and in the several courses of lectures, is intended to afford a scientific basis for the special instruction given in horticulture.

V. VETERINARY SCIENCE.

The regular course for students in Agriculture, Natural History, etc., embraces: five lectures a week during an entire academic year; laboratory work on the bones, clastic models, pathological preparations, and parasites of domestic animals; clinical instruction on cases occurring in practice.

Fall Term: Lectures on the anatomy and physiology of the animals of the farm. Attention is given to the principles of hygiene as affected by genus, breed, climate, soil, exposure, buildings, ventilation, drainage, food, and water; to the varying anatomical peculiarities which imply special aptitude for particular uses; to the data for determining age; to the principles of breeding, of shoeing, etc.

Winter Term: Lectures on general comparative pathology; on specific fevers and other contagious diseases; on the parasites and parasitic diseases of domestic animals; and on constitutional diseases. An important feature in this course is the subject of veterinary sanitary science and police, embracing as it does the prevention of animal plagues by legislative and individual action; the improvement of unhealthy localities; and the destruction of animal poisons and parasites which are intercommunicable between man and the domestic animals.

Spring Term: Lectures on the local diseases of the various systems of organs in the different animals, and on veterinary surgery.

Opportunities are afforded to students who desire it to pursue the study of Veterinary Medicine and Surgery farther than is provided for in the regular courses of study.

Veterinary Museum.

The Museum embraces the following collections:

1. The Auzoux veterinary models, comprising clastic models of the horse, showing the relative position of over three thousand anatomical parts; models of limbs, sound and with detachable pieces and their morbid counterparts, illustrating changes in diseases of the bones, joints, muscles, etc.; a set of obstetrical models, showing the virgin and gravid uterus in different animals, and the peculiarities of the female pelvis and its joints; models of the gastric cavities of domestic animals; an extensive set of models of jaws, showing the indications of age as well as of vicious habits and diseases; models of equine teeth in sections, showing structure and the changes effected by wear.

2. Skeletons of the domestic animals, articulated and unarticulated.

3. A collection of diseased bones, illustrating the various constitutional diseases which impair the nutrition of these structures, together with the changes caused by accidental injuries and purely local disease.

4. Skulls of domestic animals, prepared to illustrate the surgical operations demanded in the different genera.

5. Jaws of farm animals, illustrating the growth and wear of the teeth, age, dentinal tumors, caries, etc.

6. A collection of specimens of teratology, consisting of monstrous foals, calves, and pigs.

7. A collection of tumors and morbid growths removed from the different domestic animals.

8. Some hundreds of specimens of parasites from domestic animals.

9. A collection of calculi from the digestive and urinary organs, etc., of farm animals.

10. Foreign bodies taken from various parts of the animal economy.

11. A collection of surgical instruments used in veterinary practice.

12. A collection of medicinal agents.

13. In addition, a large number of diagrams, the property of Professor Law, available in illustration of different points in anatomy, physiology, and pathology.

The Course in Agriculture.

Leading to the Degree of Bachelor of Agriculture.

FRESHMAN YEAR.

FALL TERM.—French *or* German, 5; rhetoric, 2; geometry and conic sections, 5; freehand drawing, 3; military drill, 2; hygiene, six lectures.

WINTER TERM.—French *or* German, 5; rhetoric, 2; algebra, 5; freehand drawing, 3.

SPRING TERM.—French *or* German, 5; rhetoric, 2; trigonometry, 5; agricultural chemistry, lectures and laboratory work, 3; military drill, 2.

SOPHOMORE YEAR.

FALL TERM.—French *or* German, 3; experimental mechanics and heat, 3; agricultural chemistry, 5; zoölogy, lectures and laboratory work (vertebrates), 3; anatomy, laboratory work, 2; military drill, 2.

WINTER TERM.—French *or* German, 3; electricity and magnetism, 3; agricultural chemistry, lectures, 4; chemistry, qualitative analysis, 5; anatomy, laboratory work, 2.

SPRING TERM.—French *or* German, 3; acoustics and optics, 3; land surveying, 4; botany, lectures, 3, field-work, 2; blowpipe analysis and determinative mineralogy, 2; military drill, 2.

JUNIOR YEAR.

FALL TERM.—Botany, compositæ and gramineæ, 2; arboriculture and landscape gardening, 2; geology, 3; veterinary anatomy and physiology, 5; botany *or* chemistry, laboratory work, 3.

WINTER TERM.—Chemistry, quantitative analysis, 6; vegetable physiology, 3; vegetable histology, 2; veterinary pathology, sanitary science and parasites, 5.

SPRING TERM.—Chemistry, quantitative analysis, 7; entomology, lectures, 2, laboratory work, 2; veterinary medicine and surgery, 5.

SENIOR YEAR.

FALL TERM.—Agriculture, lectures, 5, field-work, 3; botany (fungi), 4; horticulture, lectures, 2; entomology, laboratory work, 3.

WINTER TERM.—Agriculture, lectures, 5, field-work, 2; systematic and applied botany, 3; botany *or* chemistry, laboratory work, 5; military science, 2.

SPRING TERM.—Agriculture, lectures, 3, field-work, 3; building materials and construction, 2; American law, 5.

Special students in agriculture, not candidates for a degree, are received for one, two, or three years. Such students must devote at least two-thirds of their time to studies immediately connected with agriculture.

For the requirements for admission to this course see page 29.

MECHANIC ARTS.

In 1870 the Hon. Hiram Sibley, of Rochester, N. Y., provided for the erection of a suitable building for the department of Mechanic Arts. He also gave ten thousand dollars for increasing its equipment of tools, machines, etc., and has since made a further gift of thirty thousand dollars for the endowment of the professorship of Practical Mechanics and Machine Construction. Still later he provided the means for erecting and fitting up a brass and iron foundry, and a blacksmith shop.

Closely connected with the lecture-rooms are the rooms for freehand and mechanical drawing, for the designing of machinery and pattern-making, and the machine shop. The shop practice embraces work requiring the use of all hand-tools and the machines employed in the ordinary machine shops.

Each student in the department is required to devote two hours a day to work in the shop; but such students as have, before entering, acquired sufficient practical knowledge, are admitted to advanced standing. Attendance is required upon ten lectures or recitations a week, or their equivalent, in addition to two hours daily drawing and two hours daily shop-work.

Mechanical Laboratory.

The machine shop is used for the sole purpose of giving instruction in practical work. It is supplied with lathes of various kinds, planers, grinding machines, drilling machines, shaping machines, a universal milling machine fitted for cutting plane,

bevel, and spiral gears, spiral cutters, twist drills, with additional tools and attachments for graduating scales and circles, and for working various forms and shapes.

In addition to the hand and lathe tools of the usual kinds there are tools of the greatest accuracy, consisting of standard surface-plates, straight-edges, and squares of various sizes, a standard measuring machine, measuring from zero to twelve inches by the ten-thousandth of an inch, a universal grinding machine for producing true cylindrical and conical forms, and a set of Betts' standard gauges.

In the iron and brass foundry and the blacksmith shop, instruction is given in molding, casting, and forging. The cupola used is one of Colliau's improved, with a capacity for melting one ton of iron per hour.

For the purpose of instruction in experimental work there is a twenty-ton Riehle testing machine, arranged for testing the strength of materials by tension, compression, and transverse strain; Wood's apparatus for testing steam-gauges, pressure per square inch, etc.; Richards', Thompson's, Crosley's, and Taber's steam-engine indicators; Amsler's planometer; Schaeffer & Budenberg's revolution counter, steam-gauges, injectors, inspirators, and pop-valves; Blake's, Blakesley's, Deane's, Miller's, and Woodworth's steam-pumps; Allen's, Chase's, Gardner's, Lynde's, Shive's, Waters', and Wright's governors; Baldwin's link and valve motion, and experimental valve motion; a complete collection of Reuleaux's kinematic models; together with a large collection of brass, iron, and wooden models, illustrative of mechanical principles.

The course of instruction in mechanical drawing is progressive, from geometrical drawing to the designing of machines and the making of complete working drawings.

The appliances for instruction consist of several hundred drawings selected from those of technical schools abroad, and from representative American steam-engine makers and others; of photographs, models, and machines; and of apparatus used in copying by the "blue-print process."

The Course in Mechanic Arts.

Leading to the Degree of Bachelor of Mechanical Engineering.

FRESHMAN YEAR.

FALL TERM.—German, 5; geometry and conic sections, 5; freehand drawing, 3; shop-work, 3; military drill, 2.

WINTER TERM.—German, 5; algebra, 5; freehand drawing, 3; shop-work, 3.

SPRING TERM.—German, 5; trigonometry, 5; geometrical drawing, 3; shop-work, 3; military drill, 2.

SOPHOMORE YEAR.

FALL TERM.—German, 3; rhetoric, 2; analytical geometry, 5 experimental mechanics and heat, 3; shop-work, 3; military drill, 2.

WINTER TERM.—German, 3; rhetoric, 2; calculus, 5; electricity and magnetism, 3; shop-work, 3.

SPRING TERM.—Calculus, 5; descriptive geometry, text and drawing, 4; mechanical drawing, 2; building materials, 3; shop-work, 3; military drill, 2.

JUNIOR YEAR.

FALL TERM.—Calculus and analytical geometry, 5; descriptive geometry, text and drawing, 6; mechanism, 3; shop-work, 3.

WINTER TERM.—Mechanics of engineering, 5; mechanism, 3; physics, laboratory work, 3; chemistry, 3; shop-work, 3.

SPRING TERM.—Mechanics of engineering, 5; mechanical drawing, with shades, tinting, and perspective, 3; physics, laboratory work, 3; chemistry, 3; shop-work, 3.

SENIOR YEAR.

FALL TERM.—Mechanics of engineering, 5; mechanical and working drawings, 3; physics, laboratory work, 3; steam-engine, 3; shop-work, 3.

WINTER TERM.—Mechanical drawing, 4; steam-engine, 3; metallurgy, 2; experimental work with indicators, governors, pumps, and injectors, 3; shop-work, 3; military science, 2.

SPRING TERM.—Graphical statics, 3; the use of instruments and field work, 3; chemistry, 3; technical reading and preparation of thesis, 3; shop-work, 3.

GRADUATE COURSE.

FALL TERM.—Machines for regulating, counting, etc., 3; mechanical *or* physical experiments, *or* chemistry, 3; riparian laws, contracts, patent office laws, etc., 2. *Elective*, 7.

WINTER TERM.—Machines for change of form, 3; mechanical *or* physical experiments, *or* chemistry, 3; technical reading, 2. *Elective*, 7.

SPRING TERM.—Locomotive machines, hoists, cranes, etc., 3; mechanical *or* physical experiments, *or* chemistry, 3; shop systems and accounts, 2. *Elective*, 7.

The elective studies are hydraulics, assaying, blow-pipe analysis and mineralogy, chemistry (laboratory work), physics (acoustics and optics), motors other than steam, architecture, civil engineering, shop-work, mathematics, botany, French, rhetoric, history, literature.

For the requirements for admission to these courses see page 29.

MILITARY SCIENCE.

Pursuant to the act of Congress creating the land grant on which the Cornell University is founded, and the act of the legislature of the State of New York assigning that land grant, instruction is provided in Tactics and Military Science. Drill and Military Science are "a part of the studies and exercises in all courses of study and in the requirements of all students in the University" during the fall and spring terms of the freshman and sophomore years and the winter term of the senior year. Foreigners, laboring students, and those physically unfitted therefor are excused from drill. Students are required to provide themselves with the University uniform, unless excused on account of inability to procure it, and they are held accountable for loss or injury to the arms and other public property issued to them.

The course extends through the fall and spring terms of the first two years, and the winter term of the senior year. During the first two years there are three exercises a week, of an hour each; those of the senior year consist of a regular course of lectures on the general operations and science of war, twice a week.

The subjects treated are: *The Art of War.*—To comprise the history and principles of grand and minor tactics; the organization of armies, with some account of the administrative arrangements of our own army; strategy, with historical illustrations; and accessory operations of war. *Military Engineering.*—To comprise the principles of military topography; the effect of projectiles; the principles of fortification, with their application to field works; military mining; the attack and defense of works; and the construction of military roads and bridges. *Military Law.*—To comprise the origin, principles, and limitations of military law; the nature and force of the articles of war and the general regulations for the army; a summary of the rules of evidence; the constitution, jurisdiction, and procedure of courts-martial, courts of inquiry, military commissions, and military boards.

Any student who has satisfactorily performed all the duties required for the first two years, and who is qualified therefor, may be selected for the place of a commissioned officer if needed. For the performance of his duties as a commissioned officer in the junior or senior year he is entitled to a credit of three recitations a week for each term; and, at graduation, he may receive a certificate of military proficiency with his diploma.

The practical military exercises include: *Infantry Tactics.*—To comprise the schools of the soldier, company, and battalion; with skirmishing, the forms of parade, and the duties of guards. *Artillery Practice.*—To comprise at least the school of the piece and section for the field guns, with such further artillery instruction as may be found practicable. *Special Exercises.*—To comprise recitations at such times as may be prescribed.

ARCHITECTURE.

The Course in Architecture is so arranged as to give the student instruction in all subjects which he should understand in order to enter upon the practice of the art.

The instruction is given by means of lectures and practical exercises. Its object is not merely to develop the artistic powers of the student, but to lay that foundation of knowledge without which there can be no true art. Drawing is taught during the first two years, and afterwards thoroughly used and applied in mechanics, stereotomy, and designing.

Architectural mechanics occupies a part of each term for one year. The lectures are each supplemented by at least two hours of work on problems. In developing the subjects and in solving problems, analytical methods are used, but for practical use special attention is paid to the application of graphical statics.

The study of the history of architecture and the development of the various styles runs through five terms. The lectures are illustrated by photographs, engravings, drawings, casts, and models.

Proper attention is paid to acoustics, ventilation, heating, decoration, contracts, and specifications. The whole ground of education in architecture, practical, scientific, historical, and æsthetic, is covered as completely as is practicable in a four-year course.

Equipment.

The White Architectural Library contains over one thousand volumes, and the photographic gallery nearly two thousand prints, all accessible to the student. Several hundred drawings, and about two hundred models in wood and stone have been prepared to illustrate the constructive forms and peculiarities of the different styles.

The Course in Architecture.

Leading to the Degree of Bachelor of Architecture.

FRESHMAN YEAR.

Fall Term.—French *or* German, 5; rhetoric, 2; geometry and conic sections, 5; freehand drawing, 3; linear drawing, 1; military drill, 2; hygiene, six lectures.

Winter Term.—French *or* German, 5; rhetoric, 2; algebra, 5; freehand drawing, 3; projection and tinting, 1.

Spring Term.—French *or* German, 5; trigonometry, 5; descriptive geometry, text and drawing, 4; botany, 3; military drill, 2.

SOPHOMORE YEAR.

Fall Term.—French *or* German, 3; composition and elocution, 1; analytical geometry, 5; descriptive geometry, text and drawing, 6; experimental mechanics and heat, 3; military drill, 2.

Winter Term.—French *or* German, 3; composition and elocu-

tion, 1; calculus, 5; drawing, 3; electricity and magnetism, 3, chemistry, lectures, 3.

Spring Term.—French *or* German, 3; composition and elocution, 1; drawing, 1; acoustics and optics, 3; chemistry, lectures, 3; blowpipe analysis and determinative mineralogy, 2, building materials and construction, 3; military drill, 2.

JUNIOR YEAR.

Fall Term.—Mechanics, strength of materials, 3; shades, shadows, and perspective, 3; drawing, 3; Egyptian, Greek, and Roman architecture, 3; designing, 4.

Winter Term.—Mechanics, trusses, 3; Byzantine and Romanesque architecture, 5; designing, 3; construction, 2; economic geology, 3.

Spring Term.—Mechanics, arches, 3; freehand drawing, 3 Gothic architecture, 5; designing, 3; construction, 2.

SENIOR YEAR.

Fall Term.—Renaissance architecture, 3; decoration, 3; designing, 6; stereotomy, 3.

Winter Term.—Modern architecture, 3; designing, 7; stereotomy applied to stone-cutting, 5; military science, 2.

Spring Term.—Acoustics, ventilation, warming, professional practice, measuring, contracts, specifications, etc., 5; designing, 7.

For the requirements for admission to this course see page 29.

CIVIL ENGINEERING.

The instruction is given by means of lectures and recitations, with drafting, and field and laboratory work. The field-work embraces the usual operations and the more recent methods of land, railroad, and subterranean surveying, together with hydrography and geodetic practice; and since 1874 the department of Civil Engineering has been engaged in the surveys of the hydrographic basin of central New York, as a contribution to the geodetic surveys of the United States Government.

Laboratory work is provided in chemistry, mineralogy, metallurgy, geology, physics, and civil engineering.

The students of this department receive instruction in an extended course of mechanics, as applied to engineering, and their

professional preparation comprises the following subjects: the location and construction of railroads, canals, and water-works; the construction of foundations, in water and on land, and of superstructures and tunnels; the surveys, improvements, and defenses of coasts, harbors, rivers, and lakes; the determination of astronomical co-ordinates; the application of mechanics, graphical statics, and descriptive geometry to the constructions of the various kinds of right and oblique arch bridges, roofs, trusses, and suspension bridges; the design, construction, and application of wind and hydraulic motors, air, electric, and heat engines, and pneumatic works; the drainage of towns and the reclaiming of lands; the preparation of plans and specifications, and the proper selection and tests of the materials used in constructions. As a part of their instruction, students have frequent practice in the preparation of papers on subjects of professional importance.

An elementary course of lectures is given in engineering and mining economy, finance, and jurisprudence.

To meet the growing demand for special training, the five-year course has been arranged, allowing considerable option and diversity of studies to students wishing to pursue special lines of study in bridge architecture, or in railroad, mining, topographical, sanitary, geographical, electrical, or industrial engineering.

The five-year course also offers lines of continuous study of a historical, literary, or scientific character, which may alternate with the prescribed studies, and with architecture, general science, and technology.

Equipment.

The special library of the department possesses many valuable works, among them the extensive publications recently presented to it by the French government; and in addition, the resources of the general library are available for the purposes of the department. The engineering laboratories contain various machines, models, and appliances for engineering investigations.

The engineering museums contain the following collections, which receive regular additions from a yearly appropriation:

1. The Muret collection of models in descriptive geometry and stone-cutting.

2. The De Lagrave general and special models in topography, geognosy, and engineering.

3. A nearly complete collection of the Schroeder models in descriptive geometry and stone-cutting, with some of the Olivier models, and others made at the University.

4. The Grund and Sohn collections of bridge and track details, roofs, and trusses, supplemented by similar models by Schroeder and other makers.

5. A complete railroad bridge of one-hundred-foot span, the model being one-fourth of the natural scale.

6. The Digeon collection of working models in hydraulic engineering.

7. Several collections of European photographs of engineering works during the process of construction; and many other photographs, diagrams, and models.

8. Instruments of precision for astronomical work; a Troughton & Simms' transit, a universal instrument by the same makers reading to single seconds, three sextants, two astronomical clocks, chronographs, chronometers, two small equatorials, the larger of four and a half inch aperture, made by Alvan Clark, and other instruments necessary to the equipment of a training observatory.

9. For geodetic work, a secondary base-line apparatus, made under the direction of the Coast and Geodetic Survey, and all the portable astronomical and field instruments needed, including sounding machines, deep-water thermometers, heliotropes, etc.

10. Among the coarser field instruments nearly every variety of engineers' transits, theodolites, levels, compasses, omnimeters, and tacheometers, with a large number of special instruments, such as planimeters, pantographs, elliptographs, arithmometers, tachometers, pocket altazimuths and sextants, hypsometers, and meteorological instruments of all descriptions.

The Courses in Civil Engineering.

I. A FOUR-YEAR COURSE.

Leading to the Degree of Bachelor of Civil Engineering.

FRESHMAN YEAR.

FALL TERM.—French *or* German, 5; rhetoric, 2; geometry and conic sections, 5; freehand drawing, 3; military drill, 2; hygiene, six lectures.

Winter Term.—French *or* German, 5; rhetoric, 2; algebra, 5; freehand drawing, 3; linear drawing, 2.

Spring Term.—French *or* German, 5; trigonometry, 5; descriptive geometry, text and drawing, 4; botany, 3; military drill, 2.

SOPHOMORE YEAR.

Fall Term.—French *or* German, 3; analytical geometry, 5; descriptive geometry, text and drawing, 6; experimental mechanics and heat, 3; military drill, 2.

Winter Term.—French *or* German, 3; calculus, 5; pen topography, 2; tinting and shading, 2; electricity and magnetism, 3; chemistry 3.

Spring Term.—Calculus, 5; land surveying, 4; acoustics and optics, 3; chemistry, 3; blowpipe analysis, 1; technical essays, 1; military drill, 2.

JUNIOR YEAR.

Fall Term.—Calculus, 5; mineralogy, 2; shades, shadows, and perspective, 3; topographical mapping and sketching, 2; lettering, 1; kinematics, *or* physics, laboratory work, 3; technical essays, 1.

Winter Term.—Mechanics of engineering, 5; detail drawing and graining, 2; physics, laboratory work, 3; metallurgy, 2; economic geology, 3; technical essays, 1.

Spring Term.—Mechanics of engineering, 5; railroad surveying, 5; colored topography, 3; lettering, 2; technical essays, 1.

SENIOR YEAR.

Fall Term.—Mechanics of engineering, 5; spherical astronomy, 5; practical astronomy, night observations, 2; Egyptian, Greek, and Roman architecture, *or* physics, laboratory work, 3; stereotomy and original problems, 3; civil engineering, 2; technical essays, 1.

Winter Term.—Hydraulics, 5; higher geodesy, 5; bridge stresses, 2; stone-cutting and original problems and practice, 5; technical essays, 1; military science, 2.

Spring Term.—Hydraulic motors, 2; civil engineering, 3; engineering economy, 2; bridge stresses, 5; hydrographic surveying, chart-making, and geodesy, field-work, 3; technical essays, 1; preparation of thesis.

Students in the courses in civil engineering are required to write essays upon professional subjects; and these essays are read and discussed at the weekly meetings of the Civil Engineering Association.

On the satisfactory completion of the above four-year course, students take the degree of Bachelor of Civil Engineering, and become entitled to all the privileges of resident graduates.

II. A FIVE-YEAR COURSE.

Leading to the Degree of Civil Engineer.

The first four years are the same as in the four-year course. The choice of electives in the fifth year is subject to the approval of the head of the department.

Students in the fifth year pay no tuition fees and have all the privileges of resident graduates.

FIFTH YEAR.

FALL TERM.—Riparian rights and law of contracts, 3; bridge construction and details, 3; projects, designs, and specifications, 3.

Elective, 9: Grecian history, 2; modern history, 3; psychology, 2; American history, 2 or 3; physiology and zoölogy, 6; languages, 2; technical reading, 2; renaissance architecture, 3; chemistry, laboratory work, 3; engineering, laboratory work, 3; physics, laboratory work, 3; rock drills and air compressors, 3; the steam-engine, 3; mining projects, 3; geology, 3; mineralogy, 3; mathematics, 3.

WINTER TERM.—River and harbor improvements, 3; advanced astronomy and geodesy, 3; technical reading, 2; projects, designs, and specifications, 2.

Elective, 8: Roman history, 2; American history, 2 or 3; political economy, 2; languages, 2; pure or applied mathematics, 5; zoölogy, 3; metallurgy, 3; chemistry, laboratory work, 3; engineering, laboratory work, 3; physics, laboratory work, 3; Romanesque architecture, 3; the steam-engine, 3; mining projects, 2; geology, 3.

SPRING TERM.—Sanitary engineering, 3; locomotive machines, etc., 3; projects, designs, and specifications, 2.

Elective, 6: Roman history, 2; modern history, 3; American history, 2 or 3; languages, 3; pure or applied mathematics, 4; historical or technical reading, 3; geology, 3; chemistry, laboratory work, 3; engineering, laboratory work, 3; physics, laboratory work, 3; Gothic architecture, 3; pumps and small machinery, 2; mining projects, 4; arch ribs, 3; geodesy, field-work.

For the requirements for admission to these courses see page 29.

MINING ENGINEERING.

Although no department of Mining Engineering has yet been formally established, all the main instruction required by a mining engineer is now given, as follows: the professor of civil engineering and his associates pay special attention to the needs of those intending to connect themselves with the mining industries, giving lectures on tunneling and on the theory and practice of such constructions as are common to the professions of civil and mining engineer; the professor of mechanical engineering and his associates pursue a like course, giving instruction in mining machinery; the professors of general chemistry and mineralogy, and of analytical chemistry, give instruction in metallurgy, assaying, chemical analysis, and cognate subjects; the professors of geology and palæontology give instruction in the theory and classification of ores, and in those branches relating to chemical geology.

It is intended, at an early day, to supplement the existing force by the appointment of such additional professors and lecturers as are necessary to the establishment of a mining school for the most advanced work, both as regards theory and practice. As it is, the University, by its existing provision in the departments named above, is enabled to give such instruction that a student graduating in them can, in a very short time, make himself acquainted with the practical processes; and, in all probability, by the time any student now entering the existing departments shall be sufficiently advanced to need instruction in the more elaborate special processes connected with mining, provision will have been fully made to give it.

FREEHAND DRAWING.

Instruction in Freehand Drawing is given by means of lectures and general exercises from the blackboard, from flat copies, and from models. The work embraces a thorough training of the hand and eye in outline drawing, elementary perspective, model and object drawing, drawing from casts, and sketching from nature.

The effort is not to make mere copyists, but to render the student familiar with the fundamental principles underlying this art, and to enable him to represent any object correctly and rapidly. The course is largely industrial, and the exercises are arranged, as far as possible, with special reference to the drawing required in the work of the different departments.

All students in the departments of Agriculture, Architecture, Civil Engineering, Mechanic Arts, Mathematics, and Natural History devote two hours a day to freehand drawing during the first two terms of the freshman year; and students in Architecture, in addition, two hours a day during one term of the junior year. Students in the other courses may take drawing as an elective study.

Equipment.

The department has a large collection of studies of natural and conventional forms, both shaded and in outline; of geometrical models, and of papier mache and plaster casts, including a number of antique busts, casts of parts of the human figure, studies from nature, and examples of historical ornament.

MATHEMATICS AND ASTRONOMY.

The instruction offered by this department is designed to meet the wants of all classes of students. Undergraduates in all the regular courses except Natural History have the Mathematics of the first year, namely, geometry, algebra, and trigonometry; those in Mechanic Arts, Architecture, and Civil Engineering have two or four terms of analytical geometry and calculus; those in most of the general scientific courses have analytical geometry and astronomy; and all students have the privilege of electing these and the higher branches. The full course given below is

designed for those intending to teach Mathematics, or to use it as an instrument of investigation.

According to the subject taught, there are one, two, three, or five exercises a week, consisting of lectures and recitations, with the solution of problems or with other written exercises; and much of the later work is from French or German text-books.

In all the classes frequent reviews and examinations are held during the term, besides the regular examination at its close. These preliminary examinations cover previous as well as current work, and test the student's command of general principles and methods as well as of details. They are given without notice.

The Course in Mathematics.

Leading to the Degree of Bachelor of Science.

FRESHMAN YEAR.

FALL TERM.—French *or* German, 5; rhetoric, 2; geometry and conic sections, 5; freehand drawing, 3; military drill, 2; hygiene, six lectures.

WINTER TERM.—French *or* German, 5; rhetoric, 2; algebra, 5; freehand drawing, 3; linear drawing, 2.

SPRING TERM.—French *or* German, 5; rhetoric, 2; trigonometry, 5; descriptive geometry, text and drawing, 4; military drill. 2.

SOPHOMORE YEAR.

FALL TERM.—Analytical geometry, 5; mathematical essays, 1; experimental mechanics and heat, 3; descriptive geometry, text and drawing, 6; essays and declamations, 1; military drill, 2.

WINTER TERM.—Calculus, 5; projective geometry, French text-book, 4; mathematical essays, 1; electricity and magnetism, 3; chemistry, 3; essays and declamations, 1.

SPRING TERM.—Calculus, 5; mathematical essays, 1; acoustics and optics, 3; chemistry, 3; botany, 3; essays and declamations, 1; military drill, 2.

JUNIOR YEAR.

FALL TERM.—Calculus and analytical geometry, 5; mathematical essays, 1; physics, laboratory work, 3; shades, shadows, and perspective, 3; essays, 1; *elective, not mathematics*, 3.

WINTER TERM.—Differential equations, 5; descriptive astronomy, 3; mathematical essays, 1; physics, laboratory work, 3; essays and orations, 2; *elective, not mathematics*, 3.

SPRING TERM.—Differential equations and finite differences, 5; physical astronomy, 3; mathematical essays, 1; physics, laboratory work, 3; essays and orations, 2; *elective, not mathematics*, 3.

SENIOR YEAR.

FALL TERM.—Imaginaries and elliptic functions, 3; mécanique analytique, 2; quaternions, *or* modern methods in analytical geometry, *or* applied mathematics, 4; mathematical essays, 1; English literature, 3; *elective, not mathematics*, 3.

WINTER TERM.—Imaginaries and elliptic functions, 3; mécanique analytique, 2: quaternions, *or* modern methods in analytical geometry, *or* applied mathematics, 4; mathematical essays, 1; English literature, 3; military science, 2; *elective, not mathematics*, 3.

SPRING TERM.—Imaginaries and elliptic functions, 3; mécanique analytique, 2; mathematical essays, 1; English literature, 3; Constitution of the United States, twelve lectures; *elective, not mathematics*, 3; preparation of thesis.

To graduates and special students, instruction is offered in theory of numbers, quantics, and celestial mechanics.

For the requirements for admission to this course see page 29.

CHEMISTRY AND PHYSICS.

I. PHYSICS.

The instruction comprises a general course of lectures designed as an introduction to the study of the subject, an elementary laboratory course designed to give a general knowledge of the science, and an advanced laboratory course.

The general course occupies one year, the exercises consisting of two experimental lectures and one recitation weekly. The subjects are pursued as follows: fall term, experimental mechanics and heat; winter term, electricity and magnetism; spring term, acoustics and optics. A knowledge of mathematics through plane trigonometry is required for registration in either of the subjects; and for registration in electricity and magnetism or in

acoustics and optics, a knowledge of experimental mechanics and heat is also required.

The general course is required of all students except those in History and Political Science, Arts, and Literature; and those in Mechanic Arts do not take acoustics and optics.

The elementary laboratory course consists of a series of simple experiments arranged to perfect and fix the student's knowledge of physical facts and laws, and at the same time give him some experience in physical manipulation. The course occupies seven and a half hours a week (equivalent to three hours of lectures) for one year. Considering the very elementary character of the general course, this is the minimum time that can be devoted to the work with profit to the student. The elementary laboratory course is required of all students in Mechanic Arts, Chemistry and Physics, Science, and Mathematics, and parts of it are required of those in Civil Engineering and Natural History.

Students are admitted to the laboratory to pursue only such subjects as they have completed in the general course of lectures.

The advanced laboratory course consists of a series of experiments for the establishment of physical laws and the determination of constants. Many of these experiments involve the most refined methods of measurement. Students entering this course are expected to devote to it at least seven and a half hours a week. They may enter for one or more terms at their option, and may, within certain limits, elect the line of work they wish to pursue. Special students will devote a part of their time to an original investigation.

The elementary laboratory course described above is required for admission to the advanced course. A knowledge of analytical geometry and calculus will also be found very useful.

Apparatus.

Ample rooms expressly designed for laboratory work are available. The collection includes a fine gravity escapement clock, a chronograph for measuring tenths of seconds, and another for measuring short intervals of time to the ten-thousandth of a second, two cathetometers, a dividing engine, a large spectrometer reading to seconds, a set of apparatus for electrical measurements, a set of apparatus for heat measurements, Bjerkness' apparatus

to show the analogy between magnetic phenomena and the phenomena of bodies vibrating in a fluid, besides a large collection of illustrative apparatus.

II. DESCRIPTIVE AND THEORETICAL CHEMISTRY.

The instruction begins with lectures on inorganic chemistry in the winter term of the sophomore year, and continues through two terms. Three lectures a week are given on the theoretical principles and the general study of the chemistry of inorganic bodies. During the fall term of the junior year, a course of lectures is given on the chemistry of organic bodies. In addition to the final examination at the end of the term, occasional examinations are held during the term, of which no previous notice is given, the students being expected to hold themselves in readiness for such an examination at all times.

For laboratory instruction in this branch of the subject a course of introductory practice is given in the spring term of the sophomore year. This course is required of students in Science, and of those in Chemistry and Physics, and Agriculture; it is required, further, of all students who take chemical practice as an elective study, in the beginning of their practice, except those who can give only the minimum time (seven and a half hours a week) for two or three terms, and who for sufficient reasons desire to devote all that time to chemical analysis. This introductory practice consists in the performance by the student of a series of experiments illustrating the more important general principles of the science. The details of the manipulation of each experiment are carefully described, but the results to be obtained are not given. For the better cultivation of the student's powers of observation he is required to observe and describe these results for himself, and trace their connection with the principles which they are intended to illustrate.

The instruction in theoretical chemistry is continued in the course in Chemistry and Physics by recitations in chemical philosophy, and by lectures on organic chemistry.

III. MINERALOGY AND METALLURGY.

Blowpipe Analysis.—During the spring term of the sophomore year, instruction is given in qualitative blowpipe analysis, and in

determinative mineralogy. The course is designed to enable the student to avail himself of the simple and effective means which the blowpipe affords in determining the nature of unknown substances. The work in determinative mineralogy comprises the identification of minerals by observation of their hardness, fusibility, blowpipe reactions, etc., and constitutes a necessary preparation for the study of systematic mineralogy and lithology. The laboratory of blowpipe analysis and mineralogy in the new chemical and physical building will be ready for use at the beginning of the spring term of the present year, and will be supplied with every possible convenience for the aid of students in this department.

Mineralogy.—The study of systematic mineralogy is pursued during the fall term of the junior year, and comprises lectures, conferences, and the study of specimens. The study of crystallography forms an important part of the course in mineralogy, and includes lectures illustrated by a complete set of glass models, as well as laboratory practice in the identification of crystalline forms from blocks and actual specimens. Exceptional advantages for the study of mineralogy are offered by the large and well-arranged Silliman collection of minerals, purchased in 1868, which is accessible to students at all times. A complete and carefully selected students' collection affords abundant material for work in determinative mineralogy. Special attention is given to the more important metallic ores, as a preparation for the studies of economic geology and metallurgy.

Assaying.—A thorough course of practice in assaying is given during the winter term of the junior year. Students are required to determine the value of gold, silver, and other metals contained in ores sufficient in number to make them familiar with the most approved methods in use in the West and in European mining regions. The assay of gold and silver bullion, as practiced in the national mints, forms a part of the course. The assay laboratory in the new building is now ready for use, and is equipped with every requisite for work in this branch, such as furnaces, tools, balances, etc.

Metallurgy.—During the winter term of the junior year two lectures a week are devoted to metallurgy. These lectures are intended to give the students in the technical courses a general

idea of fuels, ores, and the most important methods of extracting the metals which are especially used in construction, the metallurgy of iron naturally claiming the most attention. In the event of the establishment of a course in mining engineering, the time devoted to this subject will necessarily be largely increased.

Elective Work.—Students pursuing courses in which blowpipe analysis, mineralogy, and assaying are not required, and who desire to pursue these studies as elective work, can take them only during the terms to which they are assigned in the schedule of the technical courses, and in the order indicated above. Thus, no one is admitted to work in blowpipe analysis who has not attended the lectures on inorganic chemistry; further, no one is admitted to the advanced class in mineralogy or assaying, or to the class in lithological laboratory work in the geological department, who has not completed one term's work in blowpipe analysis.

IV. AGRICULTURAL AND ANALYTICAL CHEMISTRY.

The general subject of Agricultural Chemistry is treated in a series of about seventy-five lectures, for an account of which see page 33.

The course in analytical chemistry, beginning in the sophomore year, comprises qualitative and quantitative analysis both in the wet way and in the dry way (blowpipe analysis and assaying), and is adapted in respect to length and completeness to the course of study the student is pursuing.

In Chemistry and Physics, the qualitative analysis in the wet way and the blowpipe analysis are taken in the first two terms, beginning with the winter term of the sophomore year; this work may or may not, according to the proficiency attained in these two terms, extend into the following term. In connection with the quantitative analysis, which occupies at least a large part of the time devoted to laboratory work in the junior and senior years of this course, some practice in qualitative analysis is continued.

The quantitative work begins with general practice in the determination of bases and acids by gravimetric and volumetric methods, after which follow the analysis of minerals, ores and technical products in the wet way, and dry assaying, organic, ul-

timate, and proximate analysis, the analysis of gaseous mixtures, the chemical examination of waters and articles of food, spectroscopic analysis, the preparation of substances, and, finally, the thesis for graduation, to which most of the time of the last two terms of the course should be devoted.

In the course in Agriculture, the analytical part of agricultural chemistry begins in the fall term of the sophomore year, and comprises analysis in the wet way and with the blowpipe; it is confined to those substances that may occur in agricultural materials and products. The qualitative analysis should be completed in two terms of this year, so that all the time given to the subject in the junior and senior years may be devoted to quantitative analysis. This quantitative work begins, as in Chemistry and Physics, with general practice in the determination of bases and acids by gravimetric and volumetric methods. The chemical examination of fertilizers, soils, and agricultural products occupies the remainder of the course.

In the Medical Preparatory Course, a short course of qualitative and quantitative analysis in the wet way is given, which may carry the student far enough to qualify him to examine animal liquids by chemical methods for assistance in the diagnosis of disease. The amount of practice necessary for acquiring merely the rudiments of chemical analysis renders it impracticable to accomplish more than this in the time allotted in the course. Students intending to study medicine who have more time for chemical practice can take a longer and more thorough course, which includes a better foundation in quantitative work, and a wider application of the proficiency thus gained to the chemical examination of animal substances and articles of food and drink, and to medical jurisprudence.

Chemical Laboratory.

The new building for the department of Chemistry and Physics will be ready for occupation early in 1883. It will contain a museum, a library, laboratories, and lecture-rooms, and will be thoroughly equipped with the most recent and approved appliances for the proper prosecution of the work of the department.

The building now in use contains, besides two lecture-rooms and the private laboratories of the professors, laboratories for students, with accommodations for two hundred. It is provided

with gas and a full supply of appara...s for wet analysis, dry assaying, blowpipe, spectroscopic, and all other branches of chemical analysis. Its reading-room contains the best English, French, and German works of reference, and the current numbers of the chemical journals.

The Course in Chemistry and Physics.

Leading to the Degree of Bachelor of Science.

FRESHMAN YEAR.

FALL TERM.—French, 5, and German, 3, *or* German, 5, and French, 3; rhetoric, 2; geometry and conic sections, 5; military drill, 2; hygiene, six lectures.

WINTER TERM.—French, 5, and German, 3, *or* German 5, and French, 3; rhetoric, 2; algebra, 5.

SPRING TERM.—French, 5, and German, 3, *or* German, 5, and French, 3; rhetoric, 2; trigonometry, 5; military drill, 2.

SOPHOMORE YEAR.

FALL TERM.—French *or* German, 3; essays and declamations, 1; analytical geometry, 5; experimental mechanics and heat, 3; chemistry, laboratory work, 3; military drill, 2.

WINTER TERM.—French *or* German, 3; electricity and magnetism, 3; chemistry, lectures, 3; laboratory work, 8.

SPRING TERM.—French *or* German, 3; acoustics and optics, 3; chemistry, lectures, 3, blowpipe analysis, 3; botany, 3; military drill, 2.

JUNIOR YEAR.

FALL TERM.—Organic chemistry, 2; mineralogy, 3; chemistry and physics, laboratory work, 9; *elective, science*, 3.

WINTER TERM.—Chemical philosophy, 3; metallurgy, 2; chemistry and physics, laboratory work, 9; *elective, science*, 3.

SPRING TERM.—Chemical philosophy, 3; chemistry and physics, laboratory work, 11; *elective, science*, 3.

SENIOR YEAR.

FALL TERM.—Chemical journals, 1; history of philosophy, 3; chemistry and physics, laboratory work, 10; *elective, science*, 3.

WINTER TERM.—Chemical journals, 1; metallurgy, 2; chemis-

try and physics, laboratory work, 9; military science, 2; *elective, science*, 3.

SPRING TERM.—Chemical journals, 1; chemistry and physics, laboratory work, 12; preparation of thesis.

Of the laboratory work of the junior and senior years not less than four hours must be given to chemistry each term, and not less than four hours to physics.

For the requirements for admission to this course see page 29.

The Course in Analytical Chemistry

Leading to the Degree of Bachelor of Science.

FRESHMAN YEAR.

FALL TERM.—French, 5, and German, 3, *or* German, 5, and French, 3; rhetoric, 2; geometry and conic sections, 5; military drill, 2; hygiene, six lectures.

WINTER TERM.—French *or* German, 5; rhetoric, 2; algebra, 5; chemistry, lectures, 3, laboratory work, 3.

SPRING TERM.—French *or* German, 5; rhetoric, 2; trigonometry, 5; chemistry, lectures, 3, laboratory work, 3; military drill, 2.

SOPHOMORE YEAR.

FALL TERM.—Analytical geometry, 5; experimental mechanics and heat, 3; organic chemistry, 2; chemistry, laboratory work, 8; military drill, 2.

WINTER TERM.—Electricity and magnetism, 3; chemistry, laboratory work, 15.

SPRING TERM.—Acoustics and optics, 3; physics, laboratory work, 3; chemistry, laboratory work, 9, blowpipe analysis, 3; military drill, 2.

JUNIOR YEAR.

FALL TERM.—Chemical philosophy, 3; chemistry, laboratory work, 9; mineralogy, 3; geology, 3.

WINTER TERM.—Chemical philosophy, 3; chemistry, laboratory work, 9; assaying, 3; economic geology, 3.

SPRING TERM.—Chemical philosophy, 3; chemistry, laboratory work, 15.

SENIOR YEAR.

FALL TERM.—Chemistry, laboratory work, 15.

WINTER TERM.—Chemistry, laboratory work, 18; military science, 2.

SPRING TERM.—Chemistry, laboratory work, 15; preparation of thesis.

For the requirements for admission to this course see page 29.

NATURAL HISTORY.

I. BOTANY.

A course of lectures is given upon each of the following subjects: physiological botany, gramineæ and compositæ, vegetable physiology, vegetable histology, systematic and applied botany, higher cryptogamia, fungi, and algæ. Most of these courses of lectures are given in connection with laboratory work, which is further supplemented, whenever desirable, by field work or class excursions.

The foregoing courses of instruction occupy five hours a week for six terms, or two years. Their arrangement as regards the collegiate terms and years is seen in the tabulated statement of the course in Natural History.

In the instruction as given in the various branches of Botany, the practical bearings of the science receive due consideration. Thus, in the work on fungi a careful study is made of those forms which are destructive to cultivated plants; and in systematic botany, besides a study of the principles of classification and the special characteristics of the more prominent natural orders, some account is given of the history, uses, and importance of the chief economic species included in those orders.

The full course in Botany as laid down is not intended to be wholly inflexible, and students whose standing will warrant it may shape their studies by their taste, or by the ultimate object they have in view. To those who have completed a large share of the regular course, opportunities for advanced work are afforded, consisting mainly of original investigations in some special branch of botanical science.

Herbarium and Apparatus.

The means of illustrating the instruction in Botany include the Herbarium, estimated to contain above twenty thousand speci-

mens; two series of models, the Auzoux and the Brendel; two sets of maps, one by Achille Comte, the other by Professor Henslow; a lime lantern with five hundred views, illustrating different departments of Botany, but especially phytography; ten compound microscopes and several dissecting microscopes; a collection of fruits, barks, cones, nuts, seeds, fibers, and various dry and alcoholic specimens; a general collection of economic vegetable products, and above a thousand specimens of the woods of different countries. Besides these, the large conservatories and gardens, and an uncommonly rich native flora afford abundant material for illustration and practical work.

II. GEOLOGY AND LITHOLOGY.

Instruction is given in general and economic geology and lithology by means of lectures, laboratory practice, and field work. The lectures consist of a course on general geology in the fall term, and a course on economic geology in the winter term.

The laboratory work consists of a progressive series of exercises in determinative lithology, for which at least one term of previous work in the mineralogical laboratory is required; and of exercises in the preparation of geological sections and maps from the data furnished by government reports, and careful study of the chief characteristic fossils of the various geological periods. During the fall and spring terms there are frequent excursions and lessons in field work.

To advanced students, opportunities are offered for the microscopic investigation of minerals and rocks, and for the extended study of important mineral districts, with the preparation of reports thereon and discussions of the metallurgical methods and appliances adapted to their products. The rocks of Ithaca and its neighborhood afford ample material for study and original research.

III. PALÆONTOLOGY.

Instruction is given as follows: by laboratory work throughout the year; by excursions during the fall and spring terms to the rich fossiliferous localities in and about Ithaca; and by lectures on systematic palæontology in the winter term.

The elementary work comprises the observation and recording of facts, the collecting of material in the field, the critical study of the literature, and the classification in the laboratory of invertebrate fossils from all parts of the world.

Exceptional facilities are offered for advanced work in the interpretation of fossil forms as marks of geological age and sequence; in the study of faunas, their conditions and distribution; and in the critical study of species and genera, their characters, relations, and modifications, as exhibited in the faunas and floras of the past.

Laboratory.

The laboratory is well furnished with the appliances needful for successful study. Among other things, it has numerous maps, wall tablets, engravings of geological objects, and magic-lantern slides. Large and important additions have also been made during the past year to the lithological and stratigraphical collections.

Museum of Palæontology.

The museum comprises the following collections:

1. The Jewett Collection, accumulated by the late Col. Jewett when curator of the State Cabinet of Natural History. This collection is especially rich in New York fossils, containing many of the original specimens described in the state reports, and not a few unique specimens.

2. A fair representation of the rich faunas of the cretaceous and tertiary formations along the eastern and southern part of the Union, and a large number of characteristic English and European fossils.

3. A fine series of English mesozoic fossils; of tertiary fossils from Santo Domingo; of pre-glacial fossils from Sweden; and numerous smaller collections from various typical localities in our own country.

4. The Ward series of casts.

5. The unique collections from Brazil, made by Prof. Hartt and party on the Morgan expedition, containing the original specimens; and a great number of duplicates.

Numerous additions have been made during the past year, making the museum more complete in ichthyosaurus and other vertebrate remains, in Trenton trilobites and in the fauna of the Upper Devonian

IV. ZOÖLOGY.

The title includes human physiology and hygiene, and comparative anatomy. The instruction comprises lectures, demonstrations, laboratory and field work, as follows:

1. *Hygiene.*—Early in the fall term are given six lectures upon the personal care of health, and upon emergencies. Among other practical matters, students are shown how to check bleeding, and how to practice the best methods for resuscitating the drowned.

2. *Human Physiology.*—The thirty-six lectures treat chiefly of the subjects not included in the entrance examination, the phenomena of nervous and muscular action, the vaso-motor system, and the structure and functions of the brain. They are illustrated by a life-sized manikin and other models, by numerous anatomical preparations, by diagrams, and by painless experiments upon the frog and cat. Each student also examines, through the microscope, about thirty preparations of the tissues, including the living amœba, cilia in action, and the circulation in the frog's foot and necturus' gill.

3. *General Zoölogy.*—At one third of the sixty-six exercises the student examines and dissects representative forms, including amphioxus, lamprey, shark, perch, necturus, frog, turtle, squid, crayfish, insect, clam, bryozoön, ascidian, starfish, etc. The lectures are illustrated by a full set of Auzoux models, by diagrams and by the free use of the zoölogical collections.

4. *Comparative Anatomy.*—A course of twenty lectures is devoted either to the brain or to some special group of vertebrates. In either case, practical work is done both in dissecting and in the examination of the literature of the subject.

5. *Anatomical, Microscopical, and Experimental Technology.*—The forty lectures upon these subjects are accompanied by practical demonstrations of all the methods presented, and these methods are employed by the student in the laboratory.

LABORATORY WORK.—The laboratory work varies with the needs of the student and the extent of his preparation. Usually, as a basis for other work, the skeletons of man and the domestic cat are studied, and some of the bones are drawn and described by the student. He then dissects some of the muscles, vessels, and nerves. In the winter term, the methods of microscopical manipu-

lation are learned, and the tissues of the cat, frog, and necturus are examined. In the spring term the student examines the brain, heart, and other viscera of the cat, and performs for himself the simpler physiological experiments. Ordinarily this work can be commenced only at the beginning of the year, and the student must have had instruction in drawing.

After the first year the student, according to his purposes, dissects other vertebrate animals, or human subjects, or insects and other invertebrates. There are special facilities for the study of the brain of vertebrates.

Field Work.—During the fall and spring terms the students are occasionally accompanied by their instructors to the field or lake in order to observe living animals, and to learn the methods of their capture and preservation.

Zoölogical Collections.

1. *Vertebrates.*—There are about three thousand examples of about two thousand species of entire animals in alcohol. Half of the specimens are fishes collected in Brazil by the late Prof. C. F. Hartt; the remainder include series of named fishes from the Smithsonian Institution and the Museum of Comparative Zoölogy, representatives of the general North American fauna, and of the local fauna, and rare specimens from various parts of the world. Among the last are the following: orang, pangolin, sloths, anteaters, armadillos, ornithorhynchus, echidna, jacana, sphenodon, monitor, heloderma, crocodile, alligator, draco volans, axolotl, cryptobranchus, siren, amphiuma, pipa, ceratodus, polypterus, calamoichthys, chimæra, protopterus, myxine, bdellostoma, and amphioxus.

More than two thousand anatomical preparations, about one half of which are skulls and skeletons; the remainder brains, hearts, embryos, and other soft parts. Among them are more than two hundred and twenty preparations of the cat's brain, a large series of preparations of the lamprey and necturus, and embryos or young of opossum, kangaroo, manatee, dugong, peccary, lama, sea-lion, bat, alligator, necturus, amia, lepidosteus, shark, and skate.

About four hundred microscopical preparations, chiefly from the cat, frog, and necturus.

More than one thousand mounted skins of birds, most of which were presented by the late Green Smith, Esq.

Many mounted skins of other vertebrates, including tiger, camel, hyrax, centetes, galeopithecus, porpoise, koala, wombat, echidna, ornithorhynchus, apteryx, gavial, etc.

2. *Invertebrates.*—The general collection of invertebrates comprises a small but well selected series of forms representing all of the larger groups.

3. *Shells.*—The Newcomb collection of shells embraces more than eighty thousand examples of more than twenty thousand varieties, representing at least fifteen thousand species.

4. *Insects.*—The biological and systematic collections of insects are described elsewhere.

The Course in Natural History.

Leading to the Degree of Bachelor of Science.

FRESHMAN YEAR.

FALL TERM.—French, 5, and German, 3, *or* German, 5, and French, 3; rhetoric, 2; chemistry, laboratory work, 3; freehand drawing, 3; military drill, 2; hygiene, six lectures.

WINTER TERM.—French, 5, and German, 3, *or* German, 5, and French, 3; rhetoric, 2; chemistry, lectures, 3; freehand drawing, 3.

SPRING TERM.—French, 5, and German, 3, *or* German, 5, and French 3; chemistry, lectures, 3, laboratory work, 3; freehand drawing, 2; military drill, 2.

SOPHOMORE YEAR.

FALL TERM.—French *or* German, 3; essays and declamations, 1; experimental mechanics and heat, 3; physiology, 3; zoölogy, lectures and laboratory work (vertebrates), 3; anatomy, laboratory work, 2; anatomical technology, 1; military drill, 2.

WINTER TERM.—French *or* German, 3; essays and declamations, 1; electricity and magnetism, 3; zoölogy, lectures and laboratory work (invertebrates), 3; laboratory work in physiological anatomy and histology, 5; microscopical technology, 1.

SPRING TERM.—French *or* German, 3; essays and declamations, 1; acoustics and optics, 3; blowpipe analysis, 1; botany, lectures, 3, field work, 2; anatomy, laboratory work, 2; museum methods and experimental technology, 1; military drill 2.

JUNIOR YEAR.

Fall Term.—Essays, 1; psychology, 2; physics, laboratory work, 2; chemistry, organic, *or* laboratory work, 2; mineralogy, 2; botany, higher cryptogamia, lectures and laboratory work, 2, compositæ and gramineæ, 2; geology, 3.

Winter Term.—Essays and orations, 1; descriptive astronomy, 3; physics, laboratory work, 2; systematic and applied botany, *or* vegetable physiology, 3; vegetable histology, 2; economic geology, 3, laboratory work, 2.

Spring Term.—Essays and orations, 1; logic, 3; physical astronomy, 3; entomology, lectures, 2; geology, laboratory or field work, 3; *elective*, 4, in any two of the following subjects: physics, laboratory work, 2; botany, algæ, 2; comparative anatomy of the brain, 2; entomology, laboratory or field work, 2.

SENIOR YEAR.

Fall Term.—History of philosophy *or* modern history, 3; botany, fungi, 4; palaeontology *or* geology, laboratory and field work, 3; *elective*, 6, which may be devoted to any branch of natural history, including veterinary science.

Winter Term.—Modern history, 3; systematic and applied botany *or* vegetable physiology, 3; palæontology, lectures, 2, laboratory work, 3; military science, 2; *elective*, 5, which may be devoted to any branch of natural history, including veterinary science.

Spring Term.—Modern history, 3; palæontology, laboratory work, 3; *elective*, 9, which may be devoted to the preparation of a thesis, or to any branch of natural history, including veterinary science.

V. PRELIMINARY MEDICAL EDUCATION.

There is no medical department of the University, but special facilities are afforded those who wish their course to be of direct use in the study of medicine.

The Faculty believe that the crowded and difficult curricula of the medical schools should be preceded, when possible, both by a broad general education, and by a special and practical training in certain branches. They therefore strongly advise those who intend to become physicians to pursue some one of the full courses, and then to become resident graduates, reviewing physiology and

chemistry, attending the lectures in veterinary science, and taking laboratory work in chemistry and anatomy.

When only four years are available, the courses in Natural History, Science, and Science and Letters afford more or less time for laboratory work, especially in the senior year.

In case the student can remain but two years, he is advised to take the two-year Course Preparatory to the Study of Medicine, which embraces the branches best calculated to serve as the basis of a proper medical education.

Finally, special students are received for a shorter period than two years, if fitted to undertake the lectures and laboratory work.

A Two-Year Course Preparatory to the Study of Medicine.

Not Leading to a Degree.

FRESHMAN YEAR.

Fall Term.—French, 5; freehand drawing, 3; experimental mechanics and heat, 3; zoölogy, lectures and laboratory work, (vertebrates), 3; physiology, 3; military drill, 2; hygiene, six lectures.

Winter Term.—French, 5; electricity and magnetism, 3; chemistry, lectures, 3, laboratory work, 3; zoölogy, lectures and laboratory work (invertebrates), 3.

Spring Term.—French, 5; acoustics and optics, 3; chemistry, lectures, 3; botany, lectures, 3, laboratory work, 2; military drill, 2.

SOPHOMORE YEAR.

Fall Term.—German, 5; psychology, 2; organic chemistry, 2; anatomy, physiology, and hygiene of domestic animals, 5; anatomical technology, 1; anatomy, laboratory work, 2; military drill, 2.

Winter Term.—German, 5; vegetable physiology, 3; veterinary pathology, parasites, and sanitary science, 5; microscopical technology, 1; histology, laboratory work, 2; vegetable physiology, laboratory work, 2.

Spring Term.—German, 5; medical chemistry, 3; comparative anatomy of the brain, 2; anatomy, laboratory work, 2; museum

methods and experimental technology, 1; veterinary medicine and surgery, 5; military drill, 2.

Upon the completion of this course, or its equivalent, the student is entitled to a certificate countersigned by the professor of physiology. These certificates usually exempt the holders from one of the three years of study under the direction of a physician, commonly required for graduation in medicine.

For the requirements for admission to this course see page 30.

LANGUAGES.

I. THE ANCIENT CLASSICAL LANGUAGES.

An outline of the course of reading in the Classics is given below. Greek belongs to the course in Arts, and Latin to the courses in Arts, Literature, Philosophy, and History and Political Science. The distribution as regards the number of years of required and elective study may be seen by consulting the tabulated statements of those courses. The number of weekly exercises with all classes in Greek is three, and in Latin four, with the exceptions noted below. Instruction in Greek and Latin composition accompanies the study of the authors; lectures are occasionally substituted for recitations; and the examinations regularly comprise the translation of passages not previously seen by the student.

GREEK.

FRESHMAN YEAR.

FALL TERM.—Plato's Apology of Socrates; Grecian antiquities.

WINTER and SPRING TERMS.—Homer and Herodotus; the history of Greek literature.

SOPHOMORE YEAR.

FALL TERM.—Thucydides.

WINTER and SPRING TERMS.—Euripides, Æschylus, Aristophanes (one play of each).

JUNIOR YEAR.

FALL TERM.—Plato continued.

WINTER and SPRING TERMS.—Sophocles.

SENIOR YEAR.

Fall Term.—Selections from the Attic orators.

Winter and Spring Terms.—Dramatic poets, continued; selections from the Lyric and Bucolic poets.

LATIN.

FRESHMAN YEAR.

Fall Term.—Livy.

Winter Term.—Cicero's De Amicitia; the Odes of Horace (Book I).

Spring Term.—The Odes (Books II–IV) and Epodes of Horace.

SOPHOMORE YEAR.

Fall Term.—The Agricola, Germania, and Dialogus of Tacitus; Roman antiquities.

Winter Term.—Terence; the Satires of Horace (Book I); the history of Roman literature (text-book and lectures).

Spring Term.—The Satires (Book II) and Epistles of Horace; the history of Roman literature.

JUNIOR YEAR.

Fall Term.—The Annals or the Histories of Tacitus: *three-hour elective course.* The Georgics of Virgil: *one-hour elective course of lectures.*

Winter Term.—Juvenal: *three-hour elective course.* Cicero's Letters: *one-hour elective course of translation at sight, with lectures.*

Spring Term.—Catullus, Tibullus, Propertius: *three-hour elective course.* Persius: *one-hour elective course of lectures.*

SENIOR YEAR.

Fall Term.—Plautus; Quintilian: *three-hour elective course.* The comparative philology of Greek and Latin: *one-hour elective course of lectures.*

Winter Term.—Lucretius: *three-hour elective course.* The comparative philology of Greek and Latin: *one-hour elective course of lectures, in continuation of the work of the fall term.*

Spring Term.—The Letters of Pliny the Younger: *three-hour elective course.* Early Latin inscriptions and literature: *one-hour elective course of lectures, in continuation of the work of the fall and winter terms.*

II. ORIENTAL LANGUAGES.

None of the languages here included are required for any baccalaureate degree conferred by the University. The Professor of Sanskrit and Living Asiatic Languages gives, in addition to special instruction, lectures bearing upon ethnographical philology and general linguistic science.

III. GERMANIC LANGUAGES.

The first two years in German are specially intended, besides preparing the student for progressive and independent work in the language, to give those who have not a classical training some grammatical discipline, and an insight into the growth and relations of Indo-Germanic speech. Instruction is also given to elective classes in the more advanced study of the Germanic languages.

GERMAN.

During the whole of the freshman year Whitney's Grammar and Reader are used, accompanied by Ahn's (Fischer's) exercises in writing German. In the fall term a knowledge of the inflections is gained, the strong verbs are begun, and stories and ballads are translated, with daily exercises in writing. In the winter term the strong verbs are completed, the syntax of nouns, uses of the moods, and the arrangement of sentences are studied, with advanced translation and the writing of German. In the spring term, with advanced translation and writing, exercises in translation at sight are also given, and the relation of English to German is traced by the application of Grimm's law, in connection with the special study of etymology.

In the fall term of the sophomore year one of Schiller's or Goethe's dramas is studied, followed in the winter term by extracts from Goethe's or Schiller's prose. In the winter term a course in scientific German is also offered, as an alternative. In the spring term Goethe's Hermann und Dorothea, Lessing's Minna von Barnhelm, or some similar work, is read. The work of the fall term is chiefly philological, while in the winter and spring terms more attention is paid to literary biography and reading at sight.

During the junior and senior years occur lectures and recita-

tions, with elective classes, on German history, literature, and mythology, and courses are given varying from year to year, embracing the works of the leading authors. Classes are also formed in composition and conversation, and recent dramatic literature and the works of living novelists are read.

OTHER GERMANIC LANGUAGES.

Special instruction is offered in Gothic, Old and Middle High German, and the Scandinavian and Netherland languages.

In Gothic, the text-books are Heyne's and Bernhardt's editions of Ulfilas; in Old German, Braune's Althochdeutsches Lesebuch, with lectures on the early German alliterative poetry and the later forms of German verse. In Middle High German the epic, lyric, and didactic poetry is studied, with the addition of prose selections. The Netherland languages are pursued with special reference to the explanation of English forms and idioms, and works in modern Dutch and Flemish are read.

The Scandinavian languages are taught chiefly by means of German text-books. In Icelandic, use is made of Wimmer's Altnordische Grammatik, and Vigfusson and Powell's Icelandic Prose Reader, and lectures are given on Scandinavian history and literature.

IV. ROMANCE LANGUAGES.

FRENCH.

Joynes-Otto's Elementary French Course is studied during the fall term of the freshman year. Translation is begun in the same term and continued in connection with grammatical exercises throughout the year. The amount read is the equivalent of two of Bôcher's Modern French plays and Lacombe's Petite Histoire du Peuple Français. In the sophomore year two courses are offered, one in general literature, embracing both the modern and classical periods; and one in modern French, with special reference to its use in practical and scientific studies. In the first course are read such works as Mérimée's Colomba, Molière's Les Femmes Savantes, and Voltaire's Siècle de Louis XIV; one hour a week in the winter term is devoted to composition, and one in the spring term to conversation. In the second course are read such works as Figuier's Les Grandes Inventions Modernes and the periodical La Nature.

Elective courses are given during the junior and senior years in Old French and in recent literature and literary history.

ITALIAN.

During the first year Ricci's Italian Principia is used with Lardelli's Letture Scelte and Manzoni's I Promessi Sposi. In the second year selections are read from Dante's Inferno, and from Boccaccio and Petrarch.

SPANISH.

Knapp's Grammar of the Modern Spanish Language is used during the fall term. In the winter and spring terms, Gil Blas and Moratin's El Si de las Niñas, or similar works are read. In the second year, Don Quijote and Calderon's El Principe Constante are read.

LITERATURE.

English Literature, and Rhetoric and General Literature, form a part of each of the general courses of study, either as required or elective work, the matter being distributed as shown in the tabulated statements of those courses.

I. ANGLO-SAXON AND ENGLISH LITERATURE.

SPECIAL COURSE.

SOPHOMORE YEAR.

FALL and WINTER TERMS.—Anglo-Saxon grammar, the A.-S. Version of the Gospel according to St. John, and selections from the Homilies of Ælfric.

SPRING TERM.—Selections from King Alfred's A.-S. Version of the History of Paulus Orosius, and of Boethius De Consolatione Philosophiæ, and selections from the A.-S. Chronicle.

JUNIOR YEAR

FALL TERM.—Selections from Layamon's Brut or Chronicle of Britain, the Ancren Riwle, and the Ormulum; the Proclamation of King Henry III, and selections from Robert of Gloucester's Chronicle.

WINTER TERM.—Selections from Dan Michel's Ayenbite of Inwyt, or Remorse of Conscience, the Voiage and Travaile of Sir

John Maundeville, Trevisa's Translation of Ralph Higden's Polychronicon, the Vision of William concerning Piers Plowman, Pierce the Ploughmans Crede, and the Wycliffite Versions of the Bible.

Spring Term.—Chaucer's Prologue to the Canterbury Tales, the Knightes Tale, the Nonne Prestes Tale, etc., and lectures on the language and versification of Chaucer.

SENIOR YEAR.

Fall and Winter Terms.—The critical textual study of selected poems and plays.

Spring Term.—Lectures on Shakespeare and contemporary dramatists.

GENERAL COURSE.

JUNIOR YEAR.

Fall Term.—Lectures on the English language and literature, from Chaucer to Shakespeare, inclusive.

Winter Term.—Lectures on the English language and literature, from Milton to Cowper, inclusive.

Spring Term.—Lectures on English literature of the nineteenth century.

A syllabus of the course, prepared by the professor, presents to the student the leading points of each lecture, and the order of their treatment, designates the best editions of an author's works, or parts of them, that are generally accessible, and guides the student to such sources, philological, historical, biographical, critical, etc., as enable him to read to the best advantage.

Three lectures a week are given throughout the year.

It is sometimes found advisable to depart from the chronological order, and to begin with the lectures of the winter term, as given above, or of the spring term.

II. RHETORIC, GENERAL LITERATURE, AND ORATORY.

The course in rhetoric, general literature, and oratory extends through the four years.

The work of the freshman year embraces the principles of elementary rhetoric, including diction, the properties of the sentence, the structure of paragraphs, figures of speech, and the history and elements of the English language. In addition to recitations

on these topics, each student every week writes an exercise, which is corrected and returned to be rewritten.

The sophomore year takes up the study of narration and description, and includes the writing of essays, which, after correction, are returned to the student to be rewritten. Elocution and exercises in declamation are elective during the winter and spring terms.

The junior year includes exposition and advanced rhetoric. Original themes and orations are delivered before the class, after private criticism by the professor. During the spring term, lectures are given on oratory and orators, the themes and orations being on related topics.

The senior year continues the delivery of themes and orations and takes up the study of general literature, which is taught entirely by lectures and collateral reading. The lectures are on topics connected with the history of literature, its different periods, and the leading representative essayists and orators. Optional classes are formed for the special study of Shakespeare, Demosthenes, and the masters of English prose style, and for practice in oral discussion and extempore speaking.

MORAL AND INTELLECTUAL PHILOSOPHY.

Instruction in Philosophy begins in the fall term of the junior year. During that term it comprises a study of the physiology of the nervous system in relation to mental phenomena, and the nature and origin of knowledge; and during the winter term, the study of moral philosophy, theories of morals, and the development of moral sentiments. In the spring term the subject is logic, including the laws of thought, the formulæ of reasoning, and the various methods of proof and refutation, together with the methods of investigation and the grounds of certainty.

The subject during the fall term of the senior year is the history of philosophy, and the progress of knowledge from its beginning in Greece to the present day, with criticisms on the methods of philosophy and transcendental logic.

HISTORY AND POLITICAL SCIENCE.

I. HISTORY.

The aim in the courses of instruction in History is to present, in logical and chronological sequence:

1. *General History, Ancient, Mediæval, and Modern*, with especial reference to the political and social development of the leading nations.

2. *The Constitutional History of England*, as that which has most strongly influenced our own.

3. *The Comparative Constitutional and Legislative History of various modern states*, as eliciting facts and principles of use in solving American problems.

4. *The History, Political, Social, and Constitutional of the United States*, with a systematic effort to stimulate the student to original research into the sources of our national history.

5. *The Philosophy of History* as shown by grouping the facts and thoughts elicited in these various courses.

GENERAL HISTORY.

The instruction in General History extends through the four years, as follows:

1. General Ancient, Grecian, and Roman History, beginning with the spring term of the freshman year and continuing through the three terms of the sophomore year.

2. Mediæval History: General history of the social and political development of Europe during the Middle Ages, mainly by instruction in general English history during the sophomore year, and by special lectures in the junior year.

3. Modern History: (*a*) 1882–3, The history of France: fall term, from the close of the Middle Ages to the French Revolution; winter term, the French Revolution; spring term, the Napoleonic and recent periods. (*b*) 1883–4, The history of Germany: fall term, the period of the Reformation; winter term, from the Reformation to the French Revolution; spring term, the nineteenth century.

In connection with the above there are lectures on important points and periods in the history of other modern nations.

Instructors: President White, Professor C. K. Adams, Assistant Professor Perkins, Mr. Burr.

ENGLISH HISTORY.

The instruction in English History is given by recitations from text-books during the entire sophomore year, and by courses of lectures on the growth and principles of the constitution during the junior year. The student is expected to supplement these lectures by the use of some standard work for general details, and of monographs on particular subjects and epochs. While avoiding the more obscure technicalities, the aim is to present the great bases of law and policy on which the structure of the English government rests. The early Saxon institutions are described at some length; and the lectures follow the development of the system from this germ through its leading phases down to modern times. Special attention is paid, during the whole course, to such topics as illustrate the institutions and constitutional history of the United States.

Instructors: Professors Goldwin Smith and Tuttle, Assistant Professor Perkins.

COMPARATIVE CONSTITUTIONAL AND LEGISLATIVE HISTORY.

This subject is treated, as far as possible, in the courses of lectures upon Modern History in the junior year, and in a special course of lectures during the senior year.

Instructors: President White and Dr. Ely.

AMERICAN HISTORY.

The study of American History extends through the junior and senior years. The topics to which particular attention is paid are the following: The native races, especially the Mound-builders and the North-American Indians; the alleged Pre-Columbian discoveries; the origin and enforcement of England's claim to North America, as against competing European nations; the motives and methods of English colony-planting in America in the seventeenth and eighteenth centuries; the development of ideas and institutions in the American colonies, with particular reference to religion, education, industry, and civil freedom; the grounds of inter-colonial isolation and of inter-colonial fellowship; the causes and progress of the movement for colonial independence; the history of the formation of the national constitution; the origin and growth of political parties under the con-

stitution; the history of slavery as a factor in American politics, culminating in the civil war of 1861-65.

In the presentation of these topics, the student is constantly directed to the original sources of information concerning them, and to the true methods of historical inquiry. The effort is also made to use American literature as a means of illustrating the several periods of American history.

Instructor: Professor Tyler.

PHILOSOPHY OF HISTORY.

The lectures on this subject are given in the winter term of the senior year. Their object is to trace the origin and progress of civilization, and to point out the causes and institutions, civil, social, and religious, which have tended to advance, or to retard its progress. The first half of the course treats of general principles, and the last, of the historic progress of civilization, beginning with the settlement of the Aryan nations in Europe.

Instructor: Professor Wilson.

II. POLITICAL AND SOCIAL SCIENCE.

This division includes the following topics:

1. *Political Economy*, and the history and principles of finance.
2. *Theoretical Politics*, or the state philosophically considered.
3. *Systematic Politics*, or the state practically considered, in respect to the organization of the various functions.
4. *International Law*, including American diplomatic history, policy, and organization.
5. *American Law and Jurisprudence.*

POLITICAL ECONOMY.

The instruction in Political Economy is given by recitations from text-books in the elements of the science during the winter and spring terms of the junior year; and by a course of lectures during the fall term of the senior year, in which practical questions arising in the study of industrial society receive attention. A course of lectures upon the science of finance, embracing a study of the comparative financial administration of constitutional nations and the various sources of public revenue, is given during the senior year. Both these courses of lectures are to be supplemented by private reading.

Instructors: Professors Wilson and H. C. Adams.

THEORETICAL AND SYSTEMATIC POLITICS.

The aim of the instruction in Political Science proper is to present both the philosophical and the practical side of the subject in a logical order of treatment. It comprises the two general topics of theoretical and systematic politics.

Theoretical politics treats of primitive societies, the growth of states, forms of government, history of political literature and speculation, and the philosophy of the state.

Systematic Politics treats of states in their concrete relations, and includes such subjects as constitutional organization, legislation, administration and civil service methods, justice, revenue, military systems, and a comparative survey of existing governments. The historical and the analytical methods are both used, and the object of the course is to make the student acquainted in a scientific sense with the true principles of political organization and practice, as well as with the existing institutions of the great civilized states.

Instructor: Professor Tuttle.

INTERNATIONAL LAW AND DIPLOMACY.

The instruction in this department consists of a course of lectures given daily during the spring term of the senior year. The course treats, among other subjects, of the history and literature of the law of nations, rules of war, neutrality, prize, embassy, forms of diplomacy, history of American diplomacy, together with descriptions of some of the more famous international disputes in which the United States have been concerned. This course is not given during the year 1882–3.

Instructor: Professor Tuttle.

AMERICAN LAW AND JURISPRUDENCE.

The course consists of about forty lectures. The first three are devoted to the more general relations of man to government; then follow twelve lectures on the constitution of the United States, and five on the origin and development of international law; then lectures on the rights of persons and of property, with a general discussion of the nature of contracts, partnerships, and corporations; then lectures on crimes and criminal law; and the course concludes with four lectures on the legal maxims relating to sovereignty, legislation, customary law, and the judiciary.

Instructor: Professor Wilson.

The Course in History and Political Science.

Leading to the Degree of Bachelor of Philosophy.

The first two years of this course are regarded as mainly introductory to the studies which peculiarly belong to the general subjects of the course. Students who have completed the first two years in either of the courses in Arts, Literature, or Philosophy, may be admitted to full standing as juniors in the course in History and Political Science on passing a satisfactory examination in the History required in the first two years in this course.

Besides the prescribed work, lectures are given on important topics connected with the general subjects of the course by non-resident professors and lecturers; and these lectures, whenever given, must be attended by all the students in the course.

FRESHMAN YEAR.

FALL TERM.—French *or* German, 5; Latin, 4; rhetoric, 2; geometry and conic sections, 5; military drill, 2.

WINTER TERM.—French *or* German, 5; Latin, 4; rhetoric, 2; algebra, 5.

SPRING TERM.—Pre-historic times, 2; French *or* German, 5; Latin, 4· rhetoric 2; plane trigonometry, 3; military drill, 2.

SOPHOMORE YEAR.

FALL TERM.—Grecian history, 2; English history, 3; French, 3; German, 3; essays and declamations, 1; Greek, Latin, modern languages, mathematics, *or* natural sciences, 3; military drill, 2.

WINTER TERM.—Roman history, 2; English history, 3; French, 3; German, 3; essays and declamations, 1; Greek, Latin, modern languages, mathematics, *or* natural sciences, 3.

SPRING TERM.—Roman history, 2; English history, 3; French, 3; German, 3; essays and declamations, 1; theory of probabilities and statistics, 3; military drill, 2.

JUNIOR YEAR.

FALL TERM.—American history (pre-historic America and the period of discovery), 3; English constitutional history, 3; mediæval and modern history, 3; psychology, 2; sanitary science, labor laws and penal discipline, 2; essays, 1; *elective*, 3.

WINTER TERM.—American history (the planting of the Ameri-

can colonies), 3; modern history, 3; political economy, 2; moral philosophy and political ethics, 2; essays and orations, 2; *elective*, 3.

SPRING TERM.—American history (the institutions of the colonial times), 3; modern history, 3; logic, 3; political economy, 2; essays and orations, 2; *elective*, 3.

SENIOR YEAR.

FALL TERM.—American history (the period of the Revolution, 1765–1789), 3; modern history, 3; history of philosophy and the natural sciences, 3; theoretical politics, 2; finance and political economy, 5; general literature and oratory, 3.

WINTER TERM.—American history (first national period, 1789–1820), 3; modern history, 3; philosophy of history, 3; systematic politics, 5; comparative constitutional history, 2; general literature and oratory, 3; military science, 2.

SPRING TERM.—American history (second national period, 1820–1865), 3; modern history, 3; comparative constitutional history, 2; American law and jurisprudence, 5; international law and diplomacy, 5; orators and oratory, 1; preparation of thesis.

For the requirements for admission to this course see page 30.

GENERAL COURSES OF STUDY.

The Course in Arts.

Leading to the Degree of Bachelor of Arts.

FRESHMAN YEAR.

Fall Term.—Grecian history, 2; Greek, 3; Latin, 4; rhetoric, 2; geometry and conic sections, 5; military drill, 2; hygiene, six lectures.

Winter Term.—Roman history, 2; Greek, 3; Latin, 4; rhetoric, 2; algebra, 5.

Spring Term.—Roman history, 2; Greek, 3; Latin, 4; rhetoric, 2; trigonometry, 5; military drill, 2.

SOPHOMORE YEAR.

Fall Term.—Greek, 3; Latin, 4; essays and declamations, 1; military drill, 2; *elective*, 7.

Winter Term.—Greek, 3; Latin, 4; essays and declamations, 1; *elective*, 7.

Spring Term.—Greek, 3; Latin, 4; military drill, 2; essays and declamations, 1; *elective*, 7.

JUNIOR YEAR.

Fall Term.—Essays, 1; psychology, 2; *elective*, 12.

Winter Term.—Essays and orations, 2; moral philosophy, 2; *elective*, 11.

Spring Term.—Essays and orations, 2; logic, 3; *elective*, 10.

SENIOR YEAR.

Fall Term.—Literature and oratory, 3; history of philosophy, 3; *elective*, 9.

Winter Term.—Literature and oratory, 3; military science, 2; *elective*, 12.

Spring Term.—Literature and oratory, 1; *elective*, 11; thesis.

Students electing *chemistry* must continue the study through the two terms.

For the requirements for admission to this course see page 30.

The Course in Literature.

Leading to the Degree of Bachelor of Literature.

FRESHMAN YEAR.

FALL TERM.—Grecian history, 2; French *or* German, 3; Latin, 4; rhetoric, 2; geometry and conic sections, 5; military drill, 2; hygiene, six lectures.

WINTER TERM.—Roman history, 2; French *or* German, 3; Latin, 4; rhetoric, 2; algebra, 5.

SPRING TERM.—Roman history, 2; French *or* German, 3; Latin, 4; rhetoric, 2; trigonometry, 5; military drill, 2.

SOPHOMORE YEAR.

FALL TERM.—Anglo-Saxon, 3; French *or* German, 5; Latin, 4; essays and declamations, 1; physiology, 3; military drill, 2.

WINTER TERM.—Anglo-Saxon, 3; French *or* German, 5; Latin, 4; essays and declamations, 1; *elective*, 3.

SPRING TERM.—Anglo-Saxon, 3; French *or* German, 5; Latin, 4; essays and declamations, 1; botany, 3; military drill, 2.

JUNIOR YEAR.

FALL TERM.—Early English, 3; English literature, general course, 3; Italian *or* Spanish, 2; essays, 1; psychology, 2; Latin, modern languages, *or* science, 4.

WINTER TERM.—Early English, 3; English literature, general course, 3; Italian *or* Spanish, 2; essays and orations, 2; moral philosophy, 2; Latin, modern languages, *or* science, 4.

SPRING TERM.—Early English, 3; English literature, general course, 3; Italian *or* Spanish, 2; essays and orations, 2; logic, 3; Latin, modern languages, *or* science, 4.

SENIOR YEAR.

FALL TERM.—English literature, special course, 2; literature and oratory, 3; history of philosophy, 3; Latin, modern languages, *or* science, 7.

WINTER TERM.—English literature, special course, 2; literature and oratory, 3; philosophy of history, 3; military science, 2; Latin, modern languages, *or* science, 7.

SPRING TERM.—English literature, special course, 2; literature and oratory, 1; American law, 5; Latin, modern languages, *or* science, 4; preparation of thesis.

For the requirements for admission to this course, see page 30.

The Course in Philosophy.

Leading to the Degree of Bachelor of Philosophy.

FRESHMAN YEAR.

FALL TERM.—French *or* German, 5; Latin, 4; rhetoric, 2; geometry and conic sections, 5; military drill, 2; hygiene, six lectures.

WINTER TERM.—French *or* German, 5; Latin, 4; rhetoric, 2; algebra, 5.

SPRING TERM.—French *or* German, 5; Latin, 4; rhetoric, 2; trigonometry, 5; military drill, 2.

SOPHOMORE YEAR.

FALL TERM.—French *or* German, 3; essays and declamations, 1; analytical geometry, 5; experimental mechanics and heat, 3; zoölogy, lectures and laboratory work (vertebrates), 3; military drill, 2.

WINTER TERM.—French *or* German, 3; essays and declamations, 1; electricity and magnetism, 3; chemistry, lectures, 3; zoölogy, lectures and laboratory work (invertebrates), 3; Latin, modern languages, mathematics, *or* science, 3.

SPRING TERM.—French *or* German, 3; essays and declamations, 1; acoustics and optics, 3; chemistry, lectures, 3; botany, 3; military drill, 2; Latin, modern languages, mathematics, *or* science, 3.

JUNIOR YEAR.

FALL TERM.—English literature, 3; essays, 1; physics, *or* chemistry, laboratory work, 3; geology, 3; psychology, 2; languages, mathematics, *or* science, 4.

WINTER TERM.—English literature, 3; essays and orations, 2; descriptive astronomy, 3; physics *or* chemistry, laboratory work, 3; languages, mathematics, moral philosophy, *or* science, 5.

SPRING TERM.—English literature, 3; essays and orations, 2; physical astronomy, 3; physics *or* chemistry, laboratory work, 3; logic, 3; languages, mathematics, *or* science, 2.

SENIOR YEAR.

FALL TERM.—Literature and oratory, 3; history of philosophy, 3; *elective*, 9.

WINTER TERM.—Literature and oratory, 3; philosophy of history, 3; military science, 2; *elective*, 9.

SPRING TERM.—Literature and oratory, 1; American law, 5; *elective*, 6; preparation of thesis.

Students in Philosophy may take the Grecian and Roman history of the first year as an extra study and receive credit therefor towards graduation.

For the requirements for admission to this course see page 30.

The Course in Science.

Leading to the Degree of Bachelor of Science.

FRESHMAN YEAR.

FALL TERM.—French, 5, and German, 3, *or* German, 5, and French, 3; rhetoric, 2; geometry and conic sections, 5; military drill, 2; hygiene, six lectures.

WINTER TERM.—French, 5, and German, 3, *or* German, 5, and French, 3; rhetoric, 2; algebra, 5; linear drawing, 2.

SPRING TERM.—French, 5, and German, 3, *or* German, 5, and French, 3; trigonometry, 5; descriptive geometry, text and drawing, 4; military drill, 2.

SOPHOMORE YEAR.

FALL TERM.—French *or* German, 3; essays and declamations, 1; analytical geometry, 5; experimental mechanics and heat, 3; zoölogy, lectures and laboratory work (vertebrates), 3; military drill, 2.

WINTER TERM.—French *or* German, 3; essays and declamations, 1; electricity and magnetism, 3; chemistry, lectures, 3; zoölogy, lectures and laboratory work (invertebrates), 3; chemistry *or* zoölogy (invertebrates), laboratory work, 3.

SPRING TERM.—French *or* German, 3; essays and declamations, 1; acoustics and optics, 3; chemistry, lectures, 3; blowpipe analysis, 2; botany, 3; military drill, 2.

JUNIOR YEAR.

FALL TERM.—English literature, 3; essays, 1; physics, laboratory work, 3; organic chemistry, 2; geology, 3; *elective*, five hours, of which at least three must be given to one of the following sciences: *botany*, *chemistry* (including *mineralogy*), *zoölogy*.

WINTER TERM.—English literature, 3; essays and orations, 2; descriptive astronomy, 3; physics, laboratory work, 3; economic

geology, 3; *elective*, three hours, which must be given to one of the following sciences: *botany*, *chemistry*, *zoölogy*.

SPRING TERM.—English literature, 3; essays and orations, 2; physical astronomy, 3; physics, laboratory work, 3; *elective*, five hours, of which at least three must be given to one of the following sciences: *botany*, *chemistry*, *geology*, *zoölogy*.

SENIOR YEAR.

FALL TERM.—*Elective*, fifteen hours, of which at least eight must be given to two of the following sciences (three or five hours to each): *botany*, *chemistry*, *geology*, *zoölogy*.

WINTER TERM.—Political economy, 2; military science, 2; *elective*, thirteen hours, subject to the same conditions as in the fall term.

SPRING TERM.—Constitution of the United States, twelve lectures; *elective*, eleven hours, subject to the same conditions as in the fall term; preparation of thesis.

The elective hours not required for science in the junior and senior years may be devoted to either scientific, literary, historical, or philosophical subjects. In electing their studies in science for the junior and senior years students must take at least the minimum given throughout the year of each science chosen.

Students taking the physics of the senior year must have had the calculus of the sophomore year; those taking the geology of the senior year must have had the blowpipe determination of minerals of the sophomore year.

For the requirements for admission to this course see page 29.

The Course in Science and Letters.

Leading to the Degree of Bachelor of Science.

FRESHMAN YEAR.

FALL TERM.—French, 5, and German, 3, *or* German, 5, and French, 3; rhetoric, 2; geometry and conic sections, 5; military drill, 2; hygiene, six lectures.

WINTER TERM.—French, 5, and German, 3, *or* German, 5, and French, 3; rhetoric, 2; algebra, 5.

SPRING TERM.—French, 5, and German, 3, *or* German, 5, and French, 3; rhetoric, 2; trigonometry, 5; military drill, 2.

SOPHOMORE YEAR.

Fall Term.—French *or* German, 3; essays and declamations, 1; physiology, 3; experimental mechanics and heat, 3; zoölogy, lectures and laboratory work (vertebrates), 3; modern languages, mathematics *or* science, 2; military drill, 2.

Winter Term.—French *or* German, 3; essays and declamations, 1; electricity and magnetism, 3; chemistry, lectures, 3; zoölogy, lectures and laboratory work (invertebrates), 3; modern languages, mathematics, *or* science, 2.

Spring Term.—French *or* German, 3; essays and declamations, 1; acoustics and optics, 3; chemistry, lectures, 3; botany, 3; modern languages, mathematics, *or* science, 2; military drill, 2.

JUNIOR YEAR.

Fall Term.—English literature, 3; essays, 1; psychology, 2; geology, 3; *elective*, 7.

Winter Term.—English literature, 3; essays and orations, 2; descriptive astronomy, 3; moral philosophy, 2; *elective*, 6.

Spring Term.—English literature, 3; essays and orations, 2; physical astronomy, 3; logic, 3; *elective*, 5.

SENIOR YEAR.

Fall Term.—Literature and oratory, 3; history of philosophy, 3; *elective*, 9.

Winter Term.—Literature and oratory, 3; philosophy of history, 3; military science, 2; *elective*, 9.

Spring Term.—Literature and oratory, 1; American law, 5; *elective*, 6; preparation of thesis.

For the requirements for admission to this course see page 29.

THE UNIVERSITY LIBRARY.

The Library Council: The PRESIDENT of the University, the LIBRARIAN, HENRY B. LORD of the Board of Trustees, Professors BABCOCK, CALDWELL, CRANE, and TYLER, of the Faculty.

The Library Service: WILLARD FISKE, Librarian, GEO. W. HARRIS, assistant librarian, H. S. KEPHART and H. L. KOOPMAN, cataloguers, P. P. BARTON and E. H. WOODRUFF, assistants, C. F. LASHIER, janitor.

The Library contains about forty-six thousand volumes, besides fourteen thousand pamphlets. It is made up chiefly of the following collections: a selection of about five thousand volumes purchased in Europe in 1868, embracing works illustrative of agriculture, the mechanic arts, chemistry, engineering, the natural sciences, physiology, and veterinary surgery; THE ANTHON LIBRARY, of nearly seven thousand volumes, consisting of the collection made by the late Professor Charles Anthon, of Columbia College, in the ancient classical languages and literatures, besides works in history and general literature; THE BOPP LIBRARY, of about twenty-five hundred volumes, being the collection of the late Professor Franz Bopp, of the University of Berlin, relating to the oriental languages and literatures, and comparative philology; THE GOLDWIN SMITH LIBRARY, of thirty-five hundred volumes, presented to the University in 1869 by Professor Goldwin Smith, comprising chiefly historical works, and editions of the English and ancient classics—increased during later years by the continued liberality of the donor; the publications of the Patent Office of Great Britain, about three thousand volumes, of great importance to the student in technology and to scientific investigators; THE WHITE ARCHITECTURAL LIBRARY, a collection of over a thousand volumes relating to architecture and kindred branches of science, given by President White; THE KELLY MATHEMATICAL LIBRARY, comprising eighteen hundred volumes and seven hundred tracts, presented by the late Hon. William Kelly, of Rhinebeck; THE CORNELL AGRICULTURAL LIBRARY, bought by the Hon. Ezra Cornell, chiefly in 1868; THE SPARKS LIBRARY, being the library of the late Jared Sparks, president of Harvard University, consisting of upwards of five thousand volumes and four thousand pamphlets, relating chiefly to the history of Amer-

ica; The May Collection, relating to the history of slavery and anti-slavery, the nucleus of which was formed by the gift of the library of the late Rev. Samuel J. May, of Syracuse.

The Library is a circulating one so far as the members of the Faculty are concerned, and a library of reference for students. Undergraduates have free access to a collection of cyclopædias, dictionaries, and works of reference in the various departments of study, but they apply to the librarians for other works desired. Graduate students are admitted to the alcoves.

The Library is managed by a body known as the Library Council, which consists of seven members, as follows: The President of the University and the Librarian, *ex officio*, one trustee chosen by the Board, and four professors nominated by the Faculty and confirmed by the Board. The President of the University is *ex officio* chairman of the council. The elected members hold office one year.

By the will of Mrs. Jenny McGraw Fiske, who died in October 1881, the Library received a specific bequest and was also made residuary legatee. From this source there has been paid to the University up to the present time about $700,000; and the income from this fund, known as the McGraw Library Fund, is applied to the support and increase of the Library.

The Library, a bulletin, is issued at intervals and contains classified lists of recent accessions, and of books in various departments, as well as other bibliographical matter intended to assist students in their use of the Library.

THE MUSEUM OF NATURAL HISTORY.

The Council: The PRESIDENT of the University, W. R. HUMPHREY, of the Board of Trustees, Professors COMSTOCK, LAW, PRENTISS, TYLER, WILDER, S. G. WILLIAMS, WILSON, DUDLEY, GAGE, and H. S. WILLIAMS, of the Faculty.

The Museum of Natural History includes the collections in American archæology, botany, conchology, entomology, geology, ornithology, palæontology, veterinary science, and zoölogy. Except in botany, entomology, and veterinary science, the collections are deposited in the McGraw building. Some account of the several collections is to be found under the titles of the respective departments. Large additions have been made during the past year, and still larger ones are anticipated.

The Museum is managed by a body known as the COUNCIL OF THE MUSEUM OF NATURAL HISTORY, which consists of the President of the University, the members of the special faculty of Natural History, and the curator of the collection in American archæology, *ex officio*, and one trustee chosen by the Board, to hold office one year.

THE McGRAW-FISKE HOSPITAL.

In the year 1881, the sum of forty-five thousand dollars was bequeathed by Mrs. Jenny McGraw Fiske as a provision for the care of students who may fall ill during their attendance at the University. It is proposed that a portion of this sum be devoted to the erection of a cottage hospital, made comfortable and attractive, and thoroughly equipped in all respects; and that a trained nurse be attached to it, who shall be ready to give attention the moment it is needed.

HONORS.

I. HONORS AT GRADUATION FOR GENERAL EXCELLENCE.

Beginning with the year 1884, honors will be granted at graduation (subject to conditions stated below) to students whose general average in the studies required in their course is honorable.* These honors will be known as *honors for general excellence*, and will be recorded upon the commencement programme, and in the Register of the year following.

II. HONORS FOR DISTINGUISHED EXCELLENCE IN SPECIAL SUBJECTS.

Beginning with the year 1883, honors will be granted (subject to stated conditions) for distinguished excellence in any of the following subjects: history, political science, French, German, Greek, Latin, mathematics, chemistry, physics, entomology.

These honors will be conferred by the Faculty, upon the recommendation of the department concerned. They will be known as *special honors in* ——. They will be recorded in the Register of the year following, and *final honors* will also be announced upon the commencement programme of the year in which they are conferred.

Students who desire to be admitted as candidates for these honors must give notice in writing to the Registrar within fourteen days after the day of registration of the spring term. The special examinations for honors will be held in May.

These special examinations will be of two kinds: in certain departments, there will be but a single examination, which will be open to seniors and graduates. In certain other departments there will be, in addition to this, another examination preliminary to the final one, to be known as the mid-course examination, and to be open to sophomores and juniors, and to seniors who intend to be candidates for final honors after graduation.

Graduates of other colleges studying in Cornell University may, by vote of the Faculty, be admitted to become candidates for these honors.

* In the usage of the University, the word "honorable" means a standing of eighty per cent. of the maximum, or more; the word "creditable" means a standing between seventy and eighty per cent.

GENERAL REQUIREMENTS.

In order to become a candidate for these honors, the student must satisfy the following requirements:

1. He must have completed all the required studies of his course up to the beginning of the term in which the special examinations are held.

2. At the beginning of the term in which the special examinations are held, his average for his entire work in the studies of his course, exclusive of those in the department in which he seeks for honors, must be creditable.

3. His average for his entire work in the department in which he seeks for honors, up to the beginning of the term in which the special examinations are held, must be honorable.

4. If the department be one in which a mid-course examination is given, the applicant for final honors must have won the mid-course honors.

The candidate must pass with distinguished excellence a special examination upon subjects to be announced in advance, and present any thesis or undergo any other test that may be required of him.

Honors in special subjects will not be granted to a student whose work is unsatisfactory in any of the studies of his course during the term in which the special examinations are held.

The special requirements will be as follows:

MID-COURSE HONORS.

History; Political Science.—The candidate must have passed, with an honorable average, the required work in Grecian, Roman, and English history, and must pass, with distinguished excellence, a special examination upon a subject to be announced in advance.

The subject for 1883 is either of the following, at the option of the candidate: the Reign of Elizabeth; the history of the eighteenth century, leading to the French Revolution.

French; German.—The candidate must have passed, with an honorable average, the required work of the freshman and sophomore years, and must also pass, with distinguished excellence, a special examination upon the following subjects:

(*a*) Translation at sight from French or German.
(*b*) Translation from English into French or German.
(*c*) Translation from specified French or German authors.

The subjects for 1883 are: in French, Corneille's Horace, Molière's Le Bourgeois Gentilhomme, Voltaire's Le Siècle de Louis XIV, chaps. 1–13; in German, Lessing's Emilia Galotti, Goethe's Iphigenie auf Tauris, Schiller's Egmonts Leben und Tod and Die Belagerung von Antwerpen.

Greek; Latin.—The candidate must have passed, with an honorable average, the required work of the freshman and sophomore years, together with the courses in Grecian and Roman history; and must also pass, with distinguished excellence, a special examination upon the following subjects:

(*a*) Translation at sight from the easier Greek or Latin authors.

(*b*) Translation from English into Greek or Latin.

(*c*) Translation of passages from specified Greek or Latin authors.

The subjects for 1883 are: in Greek, Homer's Odyssey, Books 9, 10, 11, 12; in Latin, Livy, Book 21, Virgil's Aeneid, Books 9, 10.

Mathematics.—The candidate must have passed, with an honorable average, the required work of the freshman and sophomore years of the course in mathematics, with the exception of the subjects of descriptive geometry and mathematical essays, and must also pass, with distinguished excellence, a special examination upon the following subjects:

(*a*) The solving of geometric problems.

(*b*) Modern geometry and conic sections.

(*c*) Algebra, including the theory of equations and the elements of determinants.

(*d*) Plane trigonometry.

University instruction, covering many of the topics required for this examination, is given to extra classes for two hours a week through the freshman and sophomore years, and candidates for mid-course honors are advised to join these classes.

FINAL HONORS.

History; Political Science.—The candidate must be in full and regular standing in History and Political Science, with an honorable average in the special studies of that course, and must have won mid-course honors. He must also write a satisfactory thesis upon a subject specified in advance, and pass, with distinguished excellence, a special examination upon that subject.

The subject for 1884 is either of the following, at the option of the candidate: Von Holst's Constitutional History of the United

States; the history of Germany, leading to the formation of the new German Empire.

French; German.—The candidate must have won mid-course honors, and have passed, with an honorable average, an amount of elective work of the junior and senior years equivalent to three hours a week through two years; he must also present a satisfactory thesis, and must pass, with distinguished excellence, an examination upon the following subjects:

(*a*) Translation at sight from French or German.

(*b*) Translation from English into French or German.

(*c*) The political and literary history of some specified period.

(*d*) Certain specified works of that period.

The subjects for 1884 are: in French, the political and literary history of France from the Restoration in 1814 to the Revolution of 1848; and the following authors: Victor Hugo (selections from Hernani, Nôtre-Dame de Paris, and poems), Gautier (Histoire du Romantisme), De Musset (selections), Lamartine (selections). The subject of the thesis required is a comparison of the French classic and romantic dramas, including a study of the origin and development of both. In German, the political and literary history of Germany from Lessing to the death of Schiller; and the following authors: Lessing (selections from the Hamburgische Dramaturgie), Goethe (Wahrheit und Dichtung, Books 6–20), the correspondence between Schiller and Goethe. The subject of the thesis required is the *Sturm und Drang* period.

Greek; Latin.—The candidate must have won mid-course honors, must have passed, with an honorable average, in three hours a week of elective work for each of the junior and senior years, if the subject be Greek, in four hours, if it be Latin; and must also pass, with distinguished excellence, a special examination upon the following subjects:

(*a*) Translation at sight from the more difficult Greek or Latin authors.

(*b*) Translation from English into Greek or Latin.

(*c*) Translation from specified Greek or Latin authors (with commentary upon questions of history, archaeology, grammar, and etymology involved).

The subjects in Greek for 1884 are: Sophocles' Oedipus Tyrannus and Plato's Gorgias; in Latin, Plautus' Rudens, Terence's Andria, and Cicero's De Natura Deorum, Book 1.

Mathematics.—The candidate must have won mid-course honors, and must have passed, with an honorable average, in the junior work in the integral calculus, differential equations, and finite differences, and in the senior work in analytical mechanics; must pass, with distinguished excellence, an examination in special junior work in analytical geometry and calculus equivalent to two hours a term, and in special senior work, equivalent to four hours a term; and must also present a satisfactory thesis.

Chemistry; Physics.—The candidate must, by the beginning of his senior year, have completed, with an honorable average, the required chemical and physical work of the first three years of the course in chemistry and physics, together with not less than half the whole number of hours of laboratory work in chemistry and physics laid down in the fourth year of the course; and in the senior year, besides the remaining hours of chemical and physical laboratory work, he must devote at least seven additional hours a week to advanced work in either the chemical or the physical laboratory, for the preparation of a thesis based upon original investigation; and must pass, with distinguished excellence, an examination upon the subject of his special work.

Entomology.—The candidate must have passed, with an honorable average, the regular examinations in the subjects of zoölogy (vertebrate and invertebrate), microscopic technology, botany (the elementary course, including field-work), and entomology (the general course, as laid down in the sophomore and junior years of the course in Agriculture); and must also pass, with distinguished excellence, a special examination upon the results of an investigation of one or more special subjects to which he has devoted an amount of work equivalent to two hours a term for two years.

The subject for 1884 is to be selected from the following list:

(*a*) The internal anatomy of the larva of the corydalus cornutus Linn.

(*b*) The insects injurious to woolen goods in the United States.

(*c*) The insects infesting apple trees at Ithaca.

(*d*) The insects injurious to wheat in the north-eastern part of the United States.

GRADUATION.

TIME REQUIRED FOR GRADUATION.

No person may receive a baccalaureate degree who has not spent four entire years in the University, unless he has pursued elsewhere part of the studies of his course. Students admitted to advanced studies must, before the close of their first year, pass examination on the previous work of the classes they enter.

GRADUATION THESES.

Each student, before taking a degree, must submit to the Faculty a satisfactory oration, poem, or essay on some subject in science or literature, and deposit a copy in the Library. A successful thesis written for final honors may at the student's option be presented as his thesis for graduation.

THE DEGREE OF BACHELOR.

The degree of Bachelor of Science is conferred after the satisfactory completion of any one of the following courses: Science, Science and Letters, Chemistry and Physics, Analytical Chemistry, Mathematics, and Natural History. The particular course is specified in the diploma.

The degrees of Bachelor of Arts, of Literature, of Philosophy of Agriculture, of Architecture, of Civil Engineering, and of Mechanical Engineering are conferred after the satisfactory completion of the corresponding courses. The degree of Bachelor of Philosophy is also conferred after the satisfactory completion of the course in History and Political Science. The degree of Bachelor of Veterinary Science is conferred only after the completion of a full course of four years in that department.

No person may take more than one degree the same year.

ADVANCED DEGREES.

Graduate courses of study leading to advanced degrees are provided for in the following departments: Chemistry and Physics, Mathematics, Natural History; History and Political Science; Comparative Philology, Ancient Classical Languages and Literatures, Modern European Languages and Literatures, Oriental Languages and Literatures; Philosophy and Letters. Persons wishing to take an advanced degree in any of the above departments must apply to the Faculty to be admitted as candidates.

The degree of Master of Arts or Master of Science is conferred on those who have taken the corresponding baccalaureate degree here, or wherever the requirements for that degree are equal to those of this University, on the following conditions:

1. The candidate must spend at least one year at the University in a course of study marked out for him by the Faculty, must present a satisfactory thesis, and pass an examination.

2. The same degrees are conferred without residence on graduates of this University only, on conditions the same as above, except that the degree is not given until three years after the baccalaureate degree has been conferred.

3. Graduates of this University may become candidates for either of the above second degrees by passing such additiona examinations as required for the corresponding first degree.

The degree of Master of Science is conferred on graduates in Philosophy on the same conditions as on graduates in Science.

The degree of Civil Engineer is conferred (1) on bachelors of Civil Engineering, after two years of study and practice, on passing the requisite examination and presenting a satisfactory thesis · (2) on those who have completed the five-year course.

The degree of Doctor of Veterinary Medicine is conferred on bachelors of Veterinary Science after two years of additional study, on passing the requisite examination.

The degree of Doctor of Philosophy is conferred on graduates of this University, and of other universities and colleges whose requirements for the baccalaureate degree are equal to those of this University, on the following conditions:

1. In order to become a candidate the applicant must have, over and above what is required for graduation in the course in Philosophy, a knowledge of Greek equal to that required for admission to the course in Arts.

2. The candidate must spend at least two years at the University pursuing a course of study marked out by the Faculty.

3. He must, at least six weeks before commencement, present a meritorious thesis upon some subject included in the course, and pass the requisite examination.

The degree of Doctor of Science is conferred on graduates of this University, and of other universities and colleges whose requirements for the baccalaureate degree are equal to those of this University, on the following conditions:

1. In order to become a candidate the applicant must have: a knowledge of Latin and Greek at least equal to that required for admission to the course in Natural History; a knowledge of French and German equal to that required for graduation in Science; a knowledge of science, of literature, and of philosophy equal to that required for graduation in Philosophy.

2. The candidate must spend at least three years, two of them at this University, in the study of not less than two scientific subjects approved by the Faculty, in one or more of the departments of Chemistry and Physics, Mathematics, and Natural History.

3. He must pass an examination upon these subjects, showing in one of them special attainments, and must present a meritorious thesis based on special investigations, or make some other contribution to science.

Candidates for the degree of Doctor must print their theses and deposit ten copies in the Library. Candidates for other advanced degrees must deposit one copy.

No student in a graduate course is allowed to take two degrees for the same course, to take any inferior degree for any part of the study that leads to a higher one, or to be a candidate for more than one degree at the same time.

Candidates for a second degree must make application to the Registrar and present their theses at least twenty days before commencement. The examinations for advanced degrees are held the second week before commencement.

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MISCELLANEOUS INFORMATION.

COMMENCEMENT.

Commencement day is the third Thursday in June; and the annual meetings of the trustees and the alumni are held on the day before commencement.

INQUIRIES CONCERNING DEPARTMENTS.

Persons wishing more detailed information than is given in the Register as to courses of study, methods of instruction, etc., may address the professor in charge of the department concerned.

DIRECTIONS TO CANDIDATES FOR ADMISSION.

Candidates for admission will obtain permits for examination at the Registrar's office, and the results of examinations may be ascertained from the Registrar. Each person, upon admission, receives a copy of the "Rules for the Guidance of Students," and is thereafter supposed to be acquainted with its contents.

The registration day for each term is indicated in the calendar. On that day each student qualified for admission, whether previously a member of the University or not, must give notice of his studies for the term to the Registrar in person and obtain a ticket of registration. No one may register at any other time, except by permission of the Faculty. In order to join any class, the student must show his registration ticket to the instructor in charge.

EXERCISES OF THE TERM.

At the end of every term a printed schedule of the University exercises for the ensuing term is issued. Every student must take the equivalent of at least fifteen hours of recitations a week, exclusive of military drill. Two and a half hours of laboratory work, or three hours of drafting or shop-work, are regarded as the equivalent of one recitation.

EXAMINATIONS.

The regular examinations in all studies are held at the end of each term. Failure at examination entails forfeiture of position in the class, or exclusion from the course, or, in some cases, from the University. The *course-book* affords the student an opportunity of preserving a record of his examinations; it is procurable at the bookstores, and the entries in it are made by the Registrar, or by the heads of departments.

PAYMENTS TO THE UNIVERSITY.

The fee for tuition is $25 a term, payable within ten days after registration.

Tuition is free to *state students*, to *resident graduates*, and to students pursuing the prescribed course in *Agriculture*, and *intending to complete* that course.

Every person taking laboratory work in chemistry, physics, zoölogy, or entomology must deposit with the Treasurer security for the materials to be used in the laboratory. Students residing in the University buildings must pay their room-bills one term in advance. All the members of the University are held responsible for any injury done by them to its property.

A fee of $5, to cover expenses of graduation, degrees, etc., is charged to each person taking the baccalaureate degree; a fee of $10, to each person taking an advanced degree. These fees must be paid at least three days before commencement.

EXPENSES OF RESIDENCE.

The following is a fair estimate of the yearly expenses:

Tuition, $25 a term, - - - - - - -	$ 75.00
Room, board, lights, fuel, and laundry, about -	200.00
Text-books, etc., about - - - - - - -	25.00
Total, - - - - - -	$300.00

The cost for board, rent of furnished room, fuel and lights at the Sage College, varies from $5 to $6.50 a week. A student occupying alone one of the best rooms pays $6.50 a week. If two occupy such a room together, the price is $5.75. Those occupying less desirable rooms, with two in a room, pay $5 a week each. The entire building is warmed by steam, and, in most cases, the sleeping apartment is separate from the study.

The expense of living in Ithaca varies, for board, room, fuel, and lights, from $4 to $7 a week. By the formation of clubs, students may reduce their expenses to $2.50 or $3.50 a week for board.

APPENDIX.

STATE SCHOLARSHIPS.

The laws of the State of New York [chap. 585 §9, chap. 654 §1] provide that the University "shall annually receive students, one from each assembly district in the State, to be selected as hereinafter provided, and shall give them instruction in any or in all the prescribed branches of study in any department of said institution, free of any tuition fee, or of any incidental charges, to be paid to said University, unless such incidental charges shall have been made to compensate for damages needlessly or purposely done by the students to the property of said University."

There are one hundred twenty-eight assembly districts, and therefore one hundred twenty-eight free scholarships, each good for four years.

COMPETITIVE EXAMINATIONS.

The law provides that "the candidates in each county or city shall meet at such place and time in the year as the school commissioner or commissioners of the county and the boards of education of the cities in those counties which contain cities, shall appoint; and the said commissioner or commissioners, and the said board of education, or such of them as shall attend and act, shall proceed to examine said candidates and determine which of them are the best scholars."

The law is mandatory and imposes upon school commissioners of counties and boards of education of cities the duty, which they cannot avoid, of holding such competitive examinations once each year. It is understood to confer a right upon every person who is qualified to enter the examination, and who desires to obtain the scholarship, to have such an examination held; and it is believed that any such candidate for the scholarship can enforce his right, if need be, by an appeal to the proper state authorities.

The law which requires the examination to be held, requires also, by implication, that due public notice shall be given of the time and place. When it shall be held and where it shall be held, is left to the discretion of the commissioners and the boards of education; but doubtless it ought to be held in the summer after the close of the public schools for the season, and before the beginning of the fall term of the University.

Only one examination can be held during the year in any one county, and, except to fill vacancies as below, appointments can be made but once a year.

The law does not designate the studies upon which candidates shall be examined, nor have the trustees of the University expressed any opinion on the subject.

CANDIDACY.

The law provides that "the said free instruction shall moreover be accorded to said students in consideration of their superior ability, and as a reward for superior scholarship in the academies and public schools of this state. . . . In making these selections preference shall be given (where other qualifications are equal) to the sons of those who have died in the military or naval service of the United States; consideration shall be had also to the physical ability of the candidate. . . . But in no case shall any person having already entered the said university be admitted as one of such candidates."

The trustees of the University understand the law to mean that candidates must have been educated in the academies or public schools of the state, and in the county in which they offer themselves for the competition; not that they must necessarily be residents of the county in which they seek the scholarship, but only that they have attended an academy or publio school long enough to be entitled to be regarded as having obtained their education, or at least a large part of it, in the county. The length of time is not fixed by law.

They do not understand that a person otherwise qualified to be a candidate can be debarred from entering the examination in consequence of having finished his studies and been out of school for one or two years, especially if during this time he has been occupied in providing the means of defraying his expenses while attending the University. Nor do they think that the fact of his having been engaged out of the county during this time and for the purpose above mentioned ought to work to his disadvantage.

If, however, a person has been attending school, whether a public or a private school, out of the county, for the period which intervenes between his attendance upon the schools in the county and his application to be received as a candidate, this, they think, ought to exclude him from the examination in that county.

APPOINTMENT.

The law provides that the school commissioners of counties and boards of education of cities shall determine by the competitive examination above noted which of the duly qualified candidates "are the best scholars." It says: "And they shall then select therefrom to the number of one from each assembly district in said county or city, and furnish the candidates thus selected with a certificate of such election, which certificate shall entitle said student to admission to said University, subject to the examination and approval of the faculty of said University."

In deciding upon the merits of the competitors and awarding the certificates, no regard need be paid to the assembly district in which the candidate has his residence or has attended school, but the certificate must name the district for which the appointment is made.

The certificate of scholarship must in all cases be awarded on the basis of the competitive examination, and not on any examination held otherwise or elsewhere, or on any testimonials obtained from any other source.

In all cases of contested or duplicate certificates, the trustees have decided, and instructed their treasurer, to accept the first certificate that is regular on its face and granted by the proper authorities. The University proposes to leave all questions as to the regularity of the proceedings and the rights of the respective claimants to be adjusted in the county from which the student comes.

No allowance is made for absence or non-attendance upon the University by a student holding a state scholarship. His certificate secures him free tuition for only that part of the four years during which he is in attendance upon his University duties.

VACANCIES.

Whenever any student selected as above described shall have been from any cause removed from the University before the expiration of the time for which he was selected, then one of the competitors to his place may be selected to succeed him therein, as the school commissioner or commissioners of the county or the board of education of the city may direct. Preference is rightly given to competitors in the order of the superiority of their scholarship.

A certificate is good for four years from the time when the examination is held, and in case of a new certificate to fill a vacancy, that certificate will be accepted for only that portion of the four years which remains unexpired.

No appointment can be made from one county to fill a vacancy in another county.

Neglect to appoint does not create a vacancy which can be legally filled.

ENTRANCE EXAMINATION PAPERS.

JUNE 1882.

I. ENGLISH GRAMMAR.

1. Name the diphthongs in the English alphabet.

2. Specify and illustrate the various means of distinguishing between the masculine and the feminine gender of nouns.

3. What kind of nouns add *es* to the singular in order to form the plural?

4. How many case-forms in English? Write the possessive singular and the possessive plural of the following words: *ox, deer, lady, hero, genius, justice, James, church.*

5. Is there any difference between a demonstrative adjective and a demonstrative pronoun? Name some demonstrative words and state whether they are adjectives or pronouns.

6. What inflection does the adjective retain? Explain and illustrate.

7. Classify pronouns. Define each kind of pronoun. What distinction is there between the use of *our* and *ours?* How are reflexive pronouns formed?

8. Name and define the properties of verbs. Name and define the moods. Name the auxiliary verbs. What are causative verbs? Illustrate. Distinguish the forms *I ride, I do ride, I am riding, I am ridden.*

9. Distinguish between strong and weak verbs. Is *sell* strong or weak? *beat? tell? buy? feed? stand? hold?* Explain the verbs *ought* and *must.*

10. Classify adverbs. Mention an adverb of each class.

11. Classify conjunctions.

12. Parse in full all the words in the following sentence:

What I gave him was not mine to give.

13. Justify or correct the following sentences:

'T was Love's mistake who fancied what it feared.

I remember it being done.

Less than twenty tons is sufficient.

Let boys play tricks and kick the straws, not I.

There were rows of shelves on either side of the room.

"Adam, the goodliest man of men since born,
The fairest of her daughters, Eve."

To this man he presented Thomas as his father.

He loved pleasure better than his friend.

Hoping to see you soon, believe me truly yours.

14. Write the following lines in prose, supplying ellipses, removing inversions, and, when necessary, substituting prose expressions:

"Say, Muse, their names then known, who first, who last,
Roused from the slumber on that fiery couch
At their great emperor's call; as next in worth
Came singly where he stood on the bare strand;
While the promiscuous crowd stood yet aloof.
The chief were those, who, from the pit of hell
Roaming to seek their prey on earth, durst fix
Their seats long after next the seat of God,
Their altars by his altar, gods adored
Among the nations round."

15. Write a composition on one of the following subjects: *The contrast between Spring and Summer. Election Day. The Telephone.*

II. GEOGRAPHY.

1. Draw an outline map of Asia, and show thereon (1) the principal rivers and mountain chains; (2) the political divisions and chief cities.

2. Name the gulfs, seas, and bays, that border the coast of Asia.

3. Give some account of the Empire of China and state (1) its area; (2) its population; (3) its form of government; (4) its religion; (5) the chief industries of the people.

4. Name the five principal countries of Europe in the order of

(1) their size; (2) their population; (3) their wealth; (4) the intelligence of their people, and their advancement in civilization.

5. Name the capitals of these five countries; give their populations, and their latitudes.

6. Give a general description of Africa; state its size, location, and physical characteristics.

7. State what parts of Africa are civilized, what parts are half civilized, and what parts are barbarous.

8. Draw an outline map of South America, and show its chief rivers, mountains, political divisions, and cities.

9. State what parts of South America have abundant rains, and what parts are dry; and give the reasons therefor.

10. Name the three principal political divisions of North America, and give their locations with reference to each other.

11. What states of the United States (including territories) may be called cotton states? what, grain states? what, mining states?

12. What part of the world's population is christian? what part is mohammedan? what part is buddhist?

III. PHYSIOLOGY.

1. Draw diagrams of the permanent teeth on one side of the upper jaw, and give their names. State the differences in number and character between milk teeth and permanent teeth.

2. Draw an outline diagram of the alimentary canal, and name its parts.

3. Of what is the diaphragm composed? Draw diagrams showing its condition before and after inspiration.

4. What digestive actions are performed by the gastric juice? What ones can it not perform?

5. Draw a diagram of the right side of the heart showing the vessels and valves, and give their names.

IV. ARITHMETIC.

1. Define: an abstract number, multiplication, a prime number, a power of a number, the greatest common divisor of two or more numbers, a decimal fraction, proportion, compound interest.

2. Write in words, also in the Roman notation: 12, 85, 712, 8194, 364297, 8510185, 321087563.

3. Get the value of

$$(3.5 + 4.25) - (3.75 \div 2.25) + (58.75 \times 27.2 \div 11.75)$$

4. How many days from Jan. 28 1882 to May 31 1884?

5. Find the least common multiple of 78, 24, 36, 126; and of $3\frac{3}{4}$, $11\frac{1}{4}$, $4\frac{1}{11}$.

6. If 5 oxen or 7 cows eat $3\frac{4}{11}$ tons of hay in 87 days, in what time will 2 oxen and 3 cows eat $6\frac{8}{11}$ tons?

7. What principal at 7 per cent. compound interest will produce $205.90 interest in 3 yrs. 6 mos.?

8. Bought 24 yards of cloth for $$64\frac{3}{8}$ and sold it for $2.50 a yard. What per cent. is the loss?

9. Get the fourth power of $2\frac{3}{8}$ and express it as a mixed number, and the third power of $4.\dot{4}$ correct to three decimal places.

10. Find the cube root of 2 correct to three decimal places.

V. PLANE GEOMETRY.

1. Define: a theorem, a straight line, a circle, two similar figures, a right triangle, a straight line tangent to a circle, the projection of one straight line upon another, four proportional magnitudes.

2. In an isosceles triangle the angles opposite the equal sides are equal to each other.

Every equilateral triangle is also equiangular.

An isosceles triangle is symmetric about the bisector of its vertical angle.

3. To inscribe a circle in a triangle.

4. In a right triangle the square of the hypothenuse equals the sum of the squares of the other two sides.

The ratio of the diagonal of a square to one of its sides is $\sqrt{2}$.

5. If two straight lines be cut by three or more parallel straight lines, any two intercepts on the one are proportional to the two corresponding intercepts on the other.

6. The area of a circle equals half the product of its radius by its circumference.

If the ratio of the circumference to the diameter be 3.1416, how many square yards in a circle whose radius is six feet?

VI. ELEMENTARY ALGEBRA.

1. Define: an irrational number, an incommensurable number, an imaginary, a coefficient, the degree of a polynomial, the lowest common multiple of two polynomials.

2. Explain what is meant by $x^{\frac{3}{5}}$; by $x^{-\frac{1}{6}}$. Their product equals what, and why?

3. Find the value of

$$-x^5-2x^4+3x^3+4x^2-6x-5 \text{ when } x=-2.$$

4. Solve the set of equations

$$x+y+z=2, \qquad 2x+3y+4z=9, \qquad 3x-2y+z=-3.$$

5. Find the value of x from the equation

$$\frac{x}{a}+\frac{x}{b-a}=\frac{b+a}{b}.$$

6. Find the highest common divisor of x^3-1 and x^2-x; of $4x^2-12x+9$ and $6x^2-13x+6$.

7. Simplify $$\frac{3abc}{bc+ca-ab}-\frac{\dfrac{a-1}{a}+\dfrac{b-1}{b}+\dfrac{c-1}{c}}{\dfrac{1}{a}+\dfrac{1}{b}-\dfrac{1}{c}}.$$

8. Solve the quadratic $ax^2+2bx+c=0$. Form a quadratic whose roots shall equal those of the given quadratic taken with opposite signs.

9. Simplify the binominal surd $\sqrt{(7-4\sqrt{3})}$.

VII. SOLID GEOMETRY AND CONIC SECTIONS.

1. Define: two parallel planes, the plane angle of a diedral angle, a polyedron, a right section of a prism, a right cylinder, a great circle of a sphere, a spherical triangle, an ellipse, the eccentricity of a hyperbola.

2. If a straight line be perpendicular to each of two straight lines at their point of intersection, it is perpendicular to the plane of those lines.

3. The lateral area of a regular pyramid is equal to the product of the perimeter of its base by one half its slant height.

4. Any side of a spherical triangle is less than the sum of the other two sides.

Any side of a spherical polygon is less than the sum of all the other sides.

5. The volume of a sphere is equal to the area of its surface multiplied by one third of its radius.

If V stand for volume, R for radius, D for diameter, π for the ratio of the circumference of a circle to its diameter, then

$$V = \tfrac{4}{3}\pi R^3 = \tfrac{1}{6}\pi D^3.$$

The volumes of two spheres are proportional to the cubes of their radii.

6. The volumes of polyedrons circumscribed about the same sphere are proportional to the areas of their surfaces.

7. To construct an ellipse when the foci and one position of the generatrix are given.

8. If a cone of revolution be cut by a plane whose inclination to the axis is less than the inclination of an element to the axis, the section is a hyperbola.

VIII. ADVANCED ALGEBRA.

1. Define: the logarithm of a number, a root of an equation, a series, a geometric progression, the sum of an infinite decreasing geometric progression.

2. Between 5 and 45 insert three geometric means; three arithmetical means; three harmonic means.

Prove that the reciprocal of the geometric mean of two numbers is the geometric mean of their reciprocals.

3. By the "method of undetermined coefficients," expand $\dfrac{1-x}{1-2x-3x^2}$ into a series with ascending powers of x. Get four terms and the law by which the nth term is got from the two previous terms.

4. Obtain the formula for finding the nth term of a series by the "method of differences."

5. Prove that $\log \sqrt[n]{x} = \dfrac{1}{n}\log x$.

Express $\log \dfrac{\sqrt{3} \times \sqrt[3]{4}}{\sqrt[5]{6} + \sqrt[7]{12}}$ in terms of log 2 and log 3.

6. If the equation $x^n + Ax^{n-1} + Bx^{n-2} + \ldots + L = 0$ be complete, then when the signs of its alternate terms are changed, the signs of all the roots are changed.

If the coefficients be all real, the imaginary roots, if any, are even in number.

7. Find a commensurable root of the equation

$$x^4 = 4x^3 - 10x + 15,$$

remove it, and find an incommensurable root of the depressed equation correct to three decimals; remove the incommensurable root, and find by quadratics the remaining roots correct to one decimal.

IX. TRIGONOMETRY.

1. Find all the trigonometric functions of 60°, 120°, and $-\frac{1}{4}\pi$.

Express in degrees the angle whose circular measure is .3917.

2. From the formula for $\cos(A + B)$, find that for $\cos 2A$, and thence find expressions for the six functions of $\frac{1}{2}A$.

3. In a plane triangle ABC, given two sides and the included angle, $a = 9459.31$, $b = 8032.28$, $C = 55° \ 30' \ 26''$, find A, B, and c.

4. Prove all the formulæ used in solving problem 3.

5. Prove that $\tan(A + B) = \dfrac{\tan A + \tan B}{1 - \tan A \tan B}$.

From this find formula for $\tan(A + B + C)$.

6. Prove that the sum of two sides of a spherical triangle is less than, equal to, or greater than, 180°, according as the sum of the angles opposite is so.

7. Solve the spherical triangle ABC wherein $a = 63° \ 50'$, $b = 80° \ 19'$, $A = 51° \ 30'$.

8. Prove the formulæ used in solving problem 7.

X. FRENCH.

I.

Translate into French:

1. At the theatre you will see beautiful ladies and hear music from the best masters. Will your friends go? Mine will be there.

2. You may come to see me when you please. I shall always be glad to know that you are well; but do not come too early; I do not rise before seven.

3. Lend me your book; I will return it to you in the morning, if you do not tell me to give it to your brother. Shall I give it to him?

4. No; do not give it to him, let him use his own or his brother's; send it back to me.

5. I do not believe the doctor will come; whether it rains or not, he is always afraid it will be cold. He does not need any other excuse to prevent his going out.

6. I do not doubt that he is very skillful, but, unless he comes soon, I fear your friend will die. What medicine has the latter taken?

7. I had the tailor make me two coats which I have worn, one in winter, the other in summer.

8. I shall sit down now where those ladies have sat; I mean where they were sitting when I saw them. When I have rested a little, I will call you.

9. If my friend comes to find me, and I am out, tell him to wait till I come.

10. Remember to ask your father for some money, for, before you go to school, you must have pens, ink, and paper.

11. Have you heard Mrs. L. sing? I have heard her sing that song (*chanson*, f.) three times, and I have never heard it sung so well.

12. I have just finished writing my letters and I shall send them to the post office in order that they may go to-morrow.

II.

Translate into English:

Dès qu'il eut quelque connaissance de la langue latine on ***lui fit*** traduire Quinte-Curce: il ***prit*** pour ce livre un goût que le sujet lui inspirait beaucoup plus encore que le style. Celui qui lui expliquait cet auteur lui ayant demandé ce qu'il pensait d'Alexandre: "Je pense, dit le prince, que je ***voudrais*** lui ressembler." Mais, lui ***dit-on***, il ***n'a vécu*** que trente-deux ans. "Ah! reprit-il, n'est-ce pas assez quand on a ***conquis*** des royaumes?" On ne manqua pas de rapporter ces réponses au roi son père, qui s'écria, "Voilà un enfant qui ***vaudra*** mieux que moi, et qui ***ira*** plus loin que le grand Gustave." Un jour il s'amusait dans l'appartement du roi à regarder deux cartes géographiques, l'une d'une ville de Hongrie prise par les Turcs sur l'empereur, et l'autre de Riga, capitale de la Livonie, province conquise par les Suédois, depuis un siècle; au bas de la carte de la ville hongroise il y avait ces mots tirés du livre de Job: "Dieu me l'a donnée, Dieu me l'a ôtée; le nom du Seigneur soit béni." Le jeune prince ***ayant lu*** ces paroles, prit sur-le-champ un crayon, et ***écrivit*** au bas de la carte de Riga: "Dieu me l'a donnée, le Diable ne me l'ôtera

pas." Ainsi dans les actions les plus indifférentes de son enfance ce naturel indomtable laissait souvent échapper de ces traits qui caractérisent les âmes singulières, et qui marquaient ce qu'il *devait* être un jour.

On sait sous quelle discipline sévère vivaient les troupes de Charles XII; qu'elles ne pillaient pas les villes prises d'assaut avant d'en avoir reçu la permission, qu'elles allaient même au pillage avec ordre, et le quittaient au premier signal. Les Suédois se vantent encore aujourd'hui de la discipline qu'ils observèrent en Saxe, et cependant les Saxons se *plaignent* des dégâts affreux qu'ils y commirent; contradictions qu'il serait impossible de concilier, si l'on ne *savait* combien les hommes *voient* différemment les mêmes objets: il était bien difficile que les vainqueurs n'abusassent quelquefois de leurs droits, et que les vaincus ne prissent les plus légères lésions pour des brigandages barbares. Un jour le roi se promenant à cheval près de Leipsick, un paysan saxon *vint* se jeter à ses pieds pour lui demander justice d'un grenadier qui venait de lui enlever ce qui était destiné pour le dîner de sa famille: le roi fit venir le soldat: Est-il vrai, dit-il d'un visage sévère, que vous avez volé cet homme? "Sire, dit le soldat, je ne lui ai pas fait tant de mal que votre majesté en a fait à son maître; vous lui avez ôté un royaume, et je n'ai pris à ce manant qu'un dindon." Le roi donna six ducats de sa main au paysan, et pardonna au soldat en faveur de la hardiesse du bon mot, en lui disant, "*Souviens-toi*, mon ami, que si j'ai ôté un royaume au roi Auguste je n'en ai rien pris pour moi."

—VOLTAIRE, *Charles XII.*

1. Parse the words italicized in the above passages, writing the pres. ind. 3d pers. sing., pret. 2d pers. plu., fut. 2d pers. sing., subj. imperf. 3d pers. sing. of all the irregular verbs.

III.

Translate at sight:

Les ouvrages bien écrits seront les seuls qui passeront à la postérité. La quantité des connaissances, la singularité des faits, la nouveauté même des decouvertes ne sont pas des sûrs garants de l'immortalité. Si les ouvrages qui les contiennent ne roulent que sur de petits objets, s'ils sont écrits sans goût, sans noblesse et sans génie, ils périront, parce que les connaissances, les faits et les découvertes s'enlèvent aisément, se transportent, et gagnent même à

être mis en œuvre par des mains plus habiles. Ces choses sont hors de l'homme; le style est l'homme même. Le style ne peut donc ni s'enlever, ni se transporter, ni s'altérer. S'il est élevé, noble, sublime, l'auteur sera également admiré dans tour les temps; car il n'y a que la vérité que soit durable, et même éternelle. Or, un beau style n'est tel en effet que par le nombre infini des vérités qu'il présente. Toutes les beautés intellectuelles que s'y trouvent, tous les rapports dont il est composé sont autant de vérités aussi utiles, et peut-être plus précieuses pour l'esprit humain, que celles qui peuvent faire le fond du sujet.—Buffon.

La fleur donne le miel: elle est la fille du matin, le charm du printemps, la source des parfums, la grâce des vierges, l'amour des poètes. Elle passe vite comme l'homme, mais elle rend doucement ses feuilles à la terre. Chez les anciens, elle couronnait la coupe du banquet et les cheveux blancs du sage; les premiers chrétiens en couvraient les martyrs et l'autel des catacombes: aujourd'hui, et en mémoire de ces antiques jours, nous la mettons dans nos temples. Dans le monde, nous attribuons nos affections à ses couleurs: l'espérance à sa verdure, l'innocence à sa blancheur, la pudeur à ses teintes de rose; il y a des nations entières où elle est l'interprète des sentiments: livre charmant qui ne renferme aucune erreur dangereuse, et ne garde que l'histoire fugitive des révolutions du cœur!

—Chateaubriand.

XI. GERMAN.

Translate one of the passages, and answer the questions upon both of them.

I.

Es war ein Mädchen faul und wollte nicht spinnen, und die Mutter mochte sagen, was sie wollte, sie konnte es nicht dazu bringen. Endlich übernahm die Mutter einmal Zorn und Ungeduld, dass sie ihm Schläge gab, worüber es laut zu weinen anfing. Nun fuhr gerade die Königin vorbei, und als sie das Weinen hörte, liess sie anhalten, trat in das Haus und fragte die Mutter, warum sie ihre Tochter schlüge, dass man draussen auf der Strasse das Weinen hörte. Da schämte sich die Frau, dass sie die Faulheit ihrer Tochter offenbaren sollte, und sprach: "Ich kann sie nicht vom Spinnen abbringen, sie will immer und ewig spinnen, und ich bin arm und kann den

Flachs nicht herbeischaffen." Da antwortete die Königin: "Ich höre nichts lieber als Spinnen, und bin nicht vergnügter, als wenn die Räder schnurren; gebt mir eure Tochter mit ins Schloss, ich habe Flachs genug; da soll sie spinnen, so viel sie Lust hat." Die Mutter war's von Herzen gern zufrieden, und die Königin nahm das Mädchen mit. Als sie ins Schloss gekommen waren, führte sie es hinauf zu drei Kammern, die lagen von unten bis oben voll vom schönsten Flachs.

1. Give, with definite article, the nominative singular, genitive singular, and nominative plural of the nouns: *Mädchen* (1), *Schläge* (4), *Königin* (5), *Haus* (6), *Tochter* (7), *Strasse* (8), *Schloss* (15), *Herzen* (16).

2. Inflect throughout, singular and plural, *our older brother.*

3. Write the ordinal numbers from one to twenty-one.

4. Mention all the possessive adjectives, with their meanings.

5. State distinctly the different ways of forming the principal parts of verbs, with examples.

6. Define a separable, an inseparable, and a variable compound verb, with principal parts and definitions of each.

7. Give the principal parts of the verbs: *war* (1), *wollte* (1), *mochte* (2), *konnte* (2), *übernahm* (3), *anfing* (5), *fuhr vorbei* (5), *liess* (6), *trat* (6), *schlüge* (7), *führte* (18), *lagen* (19).

8. Synopsis in active and passive, indicative, subjunctive, and conditional, third, singular, of *abbringen* (10).

9. Explain the position of *waren* (18), *führte* (18).

10. What kind of subordinate sentences are respectively introduced by: *warum* (7), *dass* (7)?

II.

Wenn wir nun auf das ungeheure Gedränge in dem Corso zurückblicken, und die für einen Augenblick nur gereinigte Rennbahn gleich wieder mit Volk überschwemmt sehen, so scheinet uns Vernunft und Billigkeit das Gesetz einzugeben, dass eine jede Equipage nur suchen solle, in ihrer Ordnung das nächste ihr bequeme Gässchen zu erreichen und so nach Hause zu eilen. Allein es lenken gleich nach abgeschossenen Signalen einige Wagen in die Mitte hinein, hemmen und verwirren das Fussvolk, und weil in dem engen Mittelraume es einem einfällt, hinunter, dem andern hinauf zu fahren, so

können beide nicht von der Stelle, und hindern oft die Vernünftigern, die in der Reihe geblieben sind, auch vom Platz zu kommen. Wenn nun gar ein zurückkehrendes Pferd auf einen solchen Knoten trifft, so vermehrt sich Gefahr, Unheil und Verdruss von allen Seiten. Und doch entwickelt sich diese Verwirrung, zwar später, aber meistens glücklich. Die Nacht ist eingetreten, und ein jedes wünscht sich zu einiger Ruhe Glück.

1. Explain the derivation of the following words, and state clearly the force of each derivative element: *Gedränge* (1), *gereinigte* (2), *Stelle* (11), *Vernünftigern* (11), *glücklich* (16).

2. Give the English cognates of ten words in this passage.

XII. LATIN.

CAESAR.

Translate (at sight):

Caesar nuntiis ad civitatem Aeduorum missis qui suo beneficio conservatos docerent, quos iure belli interficere potuisset, tribusque horis noctis exercitui ad quietem datis, castra ad Gergoviam movit. Medio fere itinere equites ab Fabio missi, quanto res in periculo fuerit exponunt; summis copiis castra oppugnata demonstrant; cum crebro integri defessis succederent nostrosque assiduo labore defatigarent, quibus propter magnitudinem castrorum perpetuo esset iisdem in vallo permanendum. —B. G. VII, 41.

Give the reason for the mood and tense of *docerent*, *fuerit*; for the case of *horis*, *copiis*, *quibus*.

Give the principal parts of *docerent*, *movit*, *exponunt*, *succederent*.

Write the synopsis of *missi* in both voices.

VIRGIL.

Translate:

Ducite ab urbe domum, mea carmina, ducite Daphnim.
Talis amor Daphnim, qualis cum fessa iuvencum
Per nemora atque altos quaerendo bucula lucos
Propter aquae rivum viridi procumbit in ulva,
Perdita, nec serae meminit decedere nocti,
Talis amor teneat, nec sit mihi cura mederi.

—Ecl. VIII, 83–88.

Translate:

Ille dolis instructus et arte Pelasga
Sustulit exutas vinclis ad sidera palmas.
'Vos, aeterni ignes, et non violabile vestrum
Testor nunem' ait 'vos arae ensesque nefandi,
Quos fugi, vittaeque deum, quas hostia gessi:
Fas mihi Graiorum sacrata resolvere iura,
Fas odisse viros atque omnia ferre sub auras,
Si qua tegunt; teneor patriae nec legibus ullis.
Tu modo promissis maneas servataque serves
Troia fidem, si vera feram, si magna rependam.
—Aen. II, 152–161.

Who is the *ille*, and what are the circumstances? Tell very briefly the subject of the book.

Account for the case of *hostia* and *legibus*.

Give the meaning of each of the parts of *vinclis*, *numen*, *violabile*.

Write out the verse *fas mihi*, etc., dividing into feet and marking the caesura, and give the rule for the length of each syllable. Indicate by English spelling the Roman pronunciation of the verse.

CICERO.

[Take 1, if you have read the oration, otherwise 2].

1. Translate:

Sed quid ego longinqua commemoro? Fuit hoc quondam, fuit proprium populi Romani, longe a domo bellare et propugnaculis imperii sociorum fortunas, non sua tecta defendere. Sociis ego nostris mare per hos annos clausum fuisse dicam, cum exercitus nostri nunquam a Brundisio nisi hieme summa transmiserint? Qui ad vos ab exteris nationibus venirent, captos querar, cum legati populi Romani redempti sint? Mercatoribus tutum mare non fuisse dicam, cum duodecim secures in praedonum potestatem pervenerint? —Manil. XII.

What is the occasion of the oration?

Explain the case of *hieme*, and the mood of *dicam*.

2. Translate:

Mentes enim hominum audacissimorum sceleratae ac nefariae ne vobis nocere possent, ego providi: ne mihi noceant, vestrum est providere. Quamquam, Quirites, mihi quidem ipsi nihil ab istis iam noceri potest. Magnum enim est in bonis praesidium,

quod mihi in perpetuum comparatum est; magna in re publica dignitas, quae me semper tacita defendet; magna vis conscientiae, quam qui negligent, cum me violare volent, se ipsi indicabunt.

—Cat. III, 12.

Account for the case of *mihi*, *istis*. What kind of a genitive is *conscientiae?*

Define *iste*, *hic*, *ille*.

Translate at sight:

Atque ego celeriter Veliam devectus Brutum vidi; quanto meo dolore, non dico. Turpe mihi ipsi videbatur in eam urbem me audere reverti, ex qua Brutus cederet, et ibi velle tuto esse, ubi ille non posset. Neque vero illum similiter atque ipse eram commotum essi vidi: erectus enim maximi ac pulcherrimi facti sui conscientia nihil de suo casu, multa de vestro querebatur.

—Phil. I, 4.

Account for the mood of *posset*, and the case of *facti*.

COMPOSITION.

Translate into Latin:

I am sorry you do not pity him. If fortune had helped him, he would have become a leader among men. But now the few who still love him hope only that he will not live many years in his misery.[1] Let not the young forget, when they see such a man, that, in order to accomplish great things, it is necessary that they should have not wisdom and prudence alone, but strength of body joined to strength of mind.

XIII. GREEK.

Translate:

Πρὸς ταῦτα Φαλῖνος εἶπε· Βασιλεὺς νικᾶν ἡγεῖται, ἐπεὶ Κῦρον ἀπέκτονε. Τίς γαρ αὐτῷ ἔστιν ὅστις τῆς ἀρχῆς ἀντιποιεῖται; Νομίζει δὲ καὶ ὑμᾶς ἑαυτοῦ εἶναι, ἔχων ἐν μέσῃ τῇ ἑαυτοῦ χώρᾳ καὶ ποταμῶν ἐντὸς ἀδιαβάτων, καὶ πλῆθος ἀνθρώπων ἐφ' ὑμᾶς δυνάμενος ἀγαγεῖν ὅσον οὐδ' εἰ παρέχοι ὑμῖν δύναισθε ἂν ἀποκτεῖναι. Μετὰ τοῦτον Ξενοφῶν Ἀθηναῖος εἶπεν· Ὦ Φαλῖνε, νῦν, ὡς σὺ ὁρᾷς, ἡμῖν οὐδὲν ἔστιν ἀγαθὸν ἄλλο εἰ μὴ ὅπλα

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[1] Use adjective.

καὶ ἀρετή. Καὶ ὅπλα μὲν οὖν ἔχοντες οἰόμεθα ἂν καὶ τῇ ἀρετῇ χρῆσθαι, παραδόντες δ' ἂν ταῦτα καὶ τῶν σωμάτων στερηθῆναι. Μὴ οὖν οἴου τὰ μόνα ἡμῖν ἀγαθὰ ὄντα ὑμῖν παραδώσειν, ἀλλὰ σὺν τούτοις καὶ περὶ τῶν ὑμετέρων ἀγαθῶν μαχούμεθα. Ἀκούσας δὲ ταῦτα ὁ Φαλῖνος ἐγέλασε καὶ εἶπεν· Ἀλλὰ φιλοσόφῳ μὲν ἔοικας, ὦ νεανίσκε, καὶ λέγεις οὐκ ἀχάριστα· ἴσθι μέντοι ἀνόητος ὤν, εἰ οἴει ἂν τὴν ὑμετέραν ἀρετὴν περιγενέσθαι τῆς βασιλέως δυνάμεως.—XENOPHON, *Anabasis*, II, 1, 11–13.

Give the nom. plur. through all genders of ὅστις and τοῦτον: the gen. and dat. sing. of πλῆθος: the acc. sing. and plur. of βασιλέως, δυνάμεως.

Illustrate by an example taken from this passage what is meant by the *attributive* and the *predicative position*.

Give the general rule for the accentuation of verbs, and point out any exceptions to it that occur in this passage.

Give the *simple stem* and the *present stem* of the verbs from which ἀπέκτονε and παραδώσειν come.

Give a synopsis of οἴει through all the moods of the present, and inflect the imperfect tense.

Explain the use of ἄν in the sentence beginning Ὅπλα μὲν οὖν ἔχοντες, etc.

Translate at sight:

Μετὰ δὲ ταῦτα ὁ Ξενοφῶν ἐξαναστὰς εἶπεν· Ὦ ἄνδρες στρατιῶται, τὴν μὲν πορείαν, ὡς ἔοικε, πεζῇ ποιητέον· οὐ γὰρ ἔστι πλοῖα· ἀνάγκη δὲ πορεύεσθαι ἤδη· οὐ γὰρ ἔστι μένουσι τὰ ἐπιτήδεια. Ἡμεῖς μὲν οὖν, ἔφη, θυσόμεθα· ὑμᾶς δὲ δεῖ παρασκευάζεσθαι ὡς μαχουμένους εἴ ποτε καὶ ἄλλοτε· οἱ γὰρ πομέμιοι ἀνατεθαῤῥήκασιν (are grown bold). Ἐκ τούτου ἐθύοντο οἱ στρατηγοί, μάντις δὲ παρῆν Ἀρηξίων Ἀρκάς· θυομένοις δὲ ἐπὶ τῇ ἀφόδῳ (departure) οὐκ ἐγίγνετο τὰ ἱερά. Ταύτην μὲν οὖν τὴν ἡμέραν ἐπαύσαντο. Καί τινες ἐτόλμων λέγειν ὡς ὁ Ξενοφῶν βουλόμενος τὸ χωρίον οἰκίσαι (settle) πέπεικε τὸν μάντιν λέγειν ὡς τὰ ἱερὰ οὐ γίγνεται ἐπὶ ἀφόδῳ. Ἐντεῦθεν κηρύξας Ξενοφῶν τῇ αὔριον (morrow) παρεῖναι ἐπὶ τὴν θυσίαν τὸν βουλόμενον, καὶ μάντις εἴ τις εἴη παραγγείλας παρεῖναι ὡς συνθεασόμενον

(to observe with them) *τὰ ἱερά, ἔθυε· καὶ ἐνταῦθα παρῆσαν πολλοί. Θυομένων δὲ πάλιν εἰς τρὶς ἐπὶ τῇ ἀφόδῳ οὐκ ἐγίγνετο τὰ ἱερά. Ἐκ τούτου χαλεπῶς εἶχον οἱ στρατιῶται· καὶ γὰρ τὰ ἐπιτήδεια ἐπέλιπεν ἃ ἔχοντες ἦλθον καὶ ἀγορὰ οὐδεμία παρῆν.—Ib.*, VI, II, 12–16.

State where the following words are formed (tense, mood, voice), and give the principal parts of the verbs from which they come: *ἐξαναστάς, δεῖ, μαχουμένους, παραγγείλας, ἐπέλιπεν, ἦλθον.*

Translate into Greek:

Somebody says that we shall be foolish if we do not give up our arms to the king.

Translate:

Τὸν δ' αὖτε προσέειπε θεὰ γλαυκῶπις Ἀθήνη·
"ἦλθον ἐγὼ παύσουσα τὸ σὸν μένος, αἴ κε πίθηαι,
οὐρανόθεν· πρὸ δέ μ' ἧκε θεὰ λευκώλενος Ἥρη,
ἄμφω ὁμῶς θυμῷ φιλέουσά τε κηδομένη τε.
ἀλλ' ἄγε, λῆγ' ἔριδος, μηδὲ ξίφος ἕλκεο χειρί·
ἀλλ' ἤτοι ἔπεσιν μὲν ὀνείδισον ὡς ἔσεταί περ.
ὧδε γὰρ ἐξερέω, τὸ δὲ καὶ τετελεσμένον ἔσται·
καί ποτέ τοι τρὶς τόσσα παρέσσεται ἀγλαὰ δῶρα
ὕβριος εἵνεκα τῆσδε· σὺ δ' ἴσχεο, πείθεο δ' ἡμῖν."
Τὴν δ' ἀπαμειβόμενος προσέφη πόδας ὠκὺς Ἀχιλλεύς
"χρὴ μὲν σφωΐτερόν γε, θεά, ἔπος εἰρύσσασθαι,
καὶ μάλα περ θυμῷ κεχολωμένον· ὣς γὰρ ἄμεινον.
ὅς κε θεοῖς ἐπιπείθηται, μάλα τ' ἔκλυον αὐτοῦ."

—*Iliad*, book I.

Give the Attic form of *πίθηαι, Ἥρη, ἕλκεο, ἔσεται.* Scan l. 209, give the rule for the quantity of the final syllable of *ἄμφω*, and show why the same principle is not applied in the second foot of l. 211. Explain the mood and tense of the verbs in l. 218.

FOURTEENTH ANNUAL COMMENCEMENT.

JUNE 15, 1882.

I. THESES OF CANDIDATES FOR A BACCALAUREATE DEGREE.

Theses Presented to the Public.

1. WILLIAM ARCHIE KENT—*Oration*—The Ottoman Power in Europe.

2. IDA MAYNARD CURTIS—*Dissertation*—Colonial Life in Virginia and Massachusetts.

3. ARMIN ERNEST BRUNN—*Essay in Agriculture*—The Tineidae infesting Apple Trees at Ithaca.

4. ELLEN COIT BROWN—*Disquisition*—Hand Workers and Head Workers: A Social Problem.

5. HARRY PLATT CUSHING—*Essay in Geology*—Notes on the Geological History of Cayuga and Seneca Lakes.

6. MADELEINE SYLVESTER THOMPSON—*Oration*—The Law of Survival in History.

7. CHARLES PUTNAM BACON — *Woodford Oration* — Samuel Adams and the Political Life of his Time.

8. FRANK RANNEY LUCKEY— *Woodford Oration*—Antigone and Cordelia as Tragic Heroines.

Theses receiving Honorable Mention.

9. MARY FRANCES AYERS—The Fourteenth Century as reflected in Chaucer.

10. JOHN CASPER BRANNER—The Course and Growth of the Fibro-Vascular Bundles in Palms.

11. HOMER COLLINS—The Origins and Insertions of some of the Brachial Flexor Muscles in Man, Lion, and Cat.

12. LEWIS GEORGE FAY—Characteristics of the more important Greek Lyric Poets.

13. MARY FOWLER—Schiller and his Heroes.

14. FLORENCE MOLTHROP KELLEY—Changes, since Blackstone, in the Legal Status of the Child.

15. EUDORUS CATLINE KENNEY—An Algebraic Representation of the Categorical Syllogisms.

16. FELIX RAUKEMANN—The Early Years of Tariff Legislation in the United States.

17. JOHN CASSAN WAIT—Compressed Air and its Application.

18. Fred Davies White—The Railroad Problem in the United States.

II. THESES OF CANDIDATES FOR A SECOND DEGREE.

19. Rufus Anderson, B.M.E.—*In Mathematical Engineering*—The Electro-Mechanical Telegraph.

20. Emma Sellew Roberts, A.B.—*In Greek Literature*—Imitations and Variations of Theocritus found in Virgil's Eclogues.

21. Mary Elizabeth Roberts, Ph.B.—*In History and Political Science*—Bacon's Rebellion in Virginia in 1676.

III. PRIZES AWARDED.

The Woodford Prize in Oratory.

Divided between

Charles Putnam Bacon and Frank Ranney Luckey.

The Horace K. White Prizes in Veterinary Science.

The first to . . Homer Collins.

The second to . . Lyman Fremont Boyer.

IV. DEGREES CONFERRED.

Bachelors of Arts.

Biggs, Herman Michael,
Blachstein, Arthur,
Casey, Patrick Joseph,
Catlin, Frederick Miles,
Corbett, Flora Josephine,
Fay, Lewis George,
Hiscock, Albert King,
Smith, Isaac Parshall,
Soper, Grace Weld,
Streeter, Howard Malcom,
Tuthill, James Fred,
Wright, George Herdman,
Yeaw, Everett.

Bachelors of Literature.

Adams, John Davis,
Ayers, Mary Frances,
Carlson, Eleanore Frederica,
Cole, Chester Glen,
Cowell, Alexander Tyng,
Dibble, Henry Montgomery,
Kelley, Florence Molthrop
Sears, Stephen Parrish.

Bachelors of Philosophy.

Bacon, Charles Putnam,
Cushing, Harry Platt,
Grant, Edith,
Pierce, Daniel Addison,
Spencer, Stella Diantha.

Bachelors of Science.

In Science and Letters.

Brown, Ellen Coit,
Chester, Frederick Dixon,
Purdy, Markwell Seward,
Rackemann, Felix,

Curtis, Ida Maynard,
Fowler, Mary,
Gill, Francis Beaman,
Horr, Norton Townshend,
Horr, Rollin Cortland,
Kent, William Archie,
Leary, Frank,
Luckey, Frank Ranney,
McClelland, Robert Watson,
Rappleye, Walter Glazier,
Reed, Charles,
Reed, Jared Ackerson,
Suydam, Frederick,
Thompson, Madeleine Sylvester,
Van Pelt, Elizabeth Vredenburgh,
Wetherell, Jane Johnson,
White, Fred Davies,
Woodard, James Allen.

In Science.

Coe, Alfred Byron.

In Mathematics.

Kenney, Eudorus Catline.

In Natural History.

Branner, John Casper,
Collins, Homer,
Schenck, Herbert Dana,
Webster, John Gurdon.

In Civil Engineering.

Fairchild, Tracy Rasselas.

Bachelors of Agriculture.

Brunn, Armen Ernest,
Harding, William Elias,
Saze, Hidesabro,
Waldo, Gerald.

Bachelor of Architecture.

Brown, Frederick Lord.

Bachelors of Civil Engineering.

Bullis, Abram Rogers, B.S.,
Krusi, Hermann,
Trumbull, William,
Wait, John Cassan,

Master of Science.

Roberts, Mary Elizabeth, Ph.B.

Master of Arts.

Roberts, Emma Sellew, A.B.

Mechanical Engineer.

Anderson, Rufus, B.M.E.

Licentiate Certificates of Military Proficiency.

Horr, Rollin Cortland,
Rackemann, Felix,
Suydam, Frederick,
Woodard, James Allen,
Wright, George Herdman.

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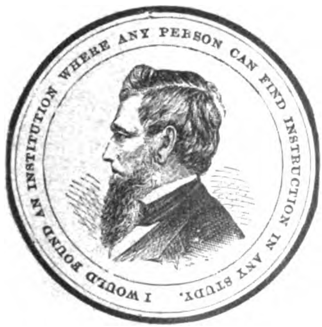
THE

CORNELL UNIVERSIT

REGISTER

1883-84



ITHACA, N. Y.

THE

CORNELL UNIVERSITY

REGISTER

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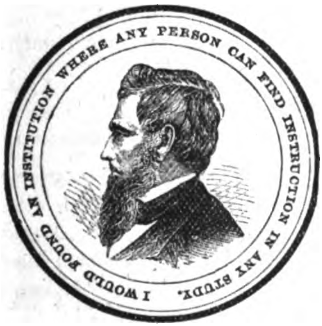

ITHACA, N. Y.

PRESS OF J. J. LITTLE & CO.,
NOS. 10 TO 20 ASTOR PLACE, NEW YORK.

CONTENTS.

THE CALENDAR.

1883–4.

FALL TERM—1883.

September	18	Tuesday	Entrance Examinations begin.
September	20	Thursday	Registration for the Term.
September	21	Friday	Instruction begins.
November		Thursday and Friday	Thanksgiving.
December	14	Friday	Term Examinations begin.
December	21	Friday	Term ends.

WINTER TERM—1884.

January	8	Tuesday	Entrance Examinations begin.
January	10	Thursday	Registration for the Term.
January	11	Friday	Instruction begins.
January	11	Friday	Founder's Day.
March	7	Friday	Woodford Prize Competition.
March	21	Friday	Term Examinations begin.
March	28	Friday	Term ends.

SPRING TERM—1884.

April	5	Saturday	Registration for the Term.
April	7	Monday	Instruction begins.
May	19	Monday	Commencement Essays due.

May	26	Monday	Theses for advanced degrees due.
June	2	Monday	Senior Examinations begin.
June	3	Tuesday	Examinations for Second Degrees.
June	6	Friday	Term Examinations begin.
June	14	Saturday	Term Examinations end.
June	16	Monday	Entrance Examinations begin.
June	17	Tuesday	Class Day.
June	18	Wednesday	Alumni Day. Annual Meeting of the Trustees.
June	19	Thursday	ANNUAL COMMENCEMENT.

FALL TERM—1884–5.

September	16	Tuesday	Entrance Examinations begin.
September	18	Thursday	REGISTRATION for the Term.
September	19	Friday	Instruction begins.

ORGANIZATION AND GOVERNMENT

FOUNDATION OF THE UNIVERSITY.

The existence of Cornell University is due to the bounty of the United States and of Ezra Cornell. On the second day of July, 1862, Congress passed an act granting public lands to the several States which should "provide at least one college where the leading object shall be, without excluding other scientific and classical studies, and including military tactics, to teach such branches of learning as are related to agriculture and the mechanic arts." Thirty thousand acres for each of its senators and representatives in Congress were appropriated to every State; and the share of the State of New York was nine hundred and ninety thousand acres in land scrip.

On the twenty-seventh of April, 1865, the Legislature of New York incorporated "The Cornell University," appropriating to it the income arising from the sale of this land scrip. The most important conditions were, that Ezra Cornell should give to the University five hundred thousand dollars; that the University should give instruction in branches relating to agriculture, mechanic arts, and military tactics; and that it should receive, without charge for tuition, one student annually from each assembly district. Mr. Cornell fulfilled the first requirement of the charter, and made an additional gift of more than two hundred acres of land, with buildings, to be used as a farm in connection with the department of agriculture.

The Act of Incorporation satisfies the condition of the congressional grant by providing for instruction in such branches of learning as are related to agriculture and the mechanic arts, and in military tactics, "in order to promote the liberal and practical education of the industrial classes in the several pursuits and professions of life." And it further declares that "such other

branches of science and knowledge may be embraced in the plan of instruction and investigation pertaining to the University, as the trustees may deem useful and proper."

The University, organized in accordance with the requirements of its charter, was opened on the seventh of October, 1868.

TRUSTEES.

The number of trustees, when the Board is full, is twenty-three. The eldest male lineal descendant of the Founder is, by the law of the State, a trustee, as are also seven others, the President of the University, the Governor of the State of New York, the Lieutenant-Governor, the Speaker of the Assembly, the Superintendent of Public Instruction, the President of the State Agricultural Society, and the Librarian of the Cornell Library.

Of the remaining fifteen, two are elected annually by the trustees and one by the alumni. The term of every trustee not *ex officio* is five years.

FACULTY.

The Faculty consists of professors, associate professors, and assistant professors, and is aided by non-resident professors and lecturers, and by instructors and examiners. It comprises the following special faculties: Agriculture; Architecture; Chemistry and Physics; Civil Engineering; History and Political Science; Ancient Classical Languages; Germanic Languages; Oriental Languages; Romance Languages; Mathematics; Mechanic Arts; Military Science; Natural History; Philosophy and Letters. The several special faculties constitute standing committees to which are referred questions relating to the departments under their control, but their action is subject to the approval of the general faculty.

STATE STUDENTS.

The ninth paragraph of the original Act of Incorporation provides for the admission of one student annually from each assembly district without payment of tuition. The number thus received, when all the scholarships are filled, is five hundred and twelve. These State Students are to be selected, by yearly competitive examinations, from the various academies and public schools of the State. It is the duty of the school commissioners of counties and of the boards of education of cities to hold and conduct such examinations, and to award the scholarships. As

the law requires the selection of "the best scholar," no distinction on account of sex is recognized in the competition. For further details regarding this subject, see instructions with regard to Scholarships, under the appropriate head below.

OPTIONAL AND SPECIAL STUDENTS.

It was one of the leading objects in founding the University to provide for the wants of those who, though earnest and industrious students, cannot complete a full four-year course. The class distinctions which are in most cases strictly observed elsewhere, are not regarded by the Faculty of the University as any obstacle to recitation and attendance upon lectures with any class which the student is prepared to join.

Special students are admitted for a limited period without examination. They must be twenty-one years old, and of approved character and attainments.

GRADUATE STUDENTS.

For purposes of advanced study the University extends its privileges to its own graduates, and to graduates of like standing from other colleges and universities, and it confers advanced degrees under conditions described elsewhere; but graduate students who are not candidates for a degree are received in any department, and for any length of time.

HIGHER EDUCATION OF WOMEN.

By an act of the trustees, passed in April, 1872, women are admitted to the University on the same terms as men, except that they must be seventeen years old. A separate building, the Sage College, has been erected and furnished for their residence. The entrance examinations and all the studies, except military science, are the same for women as for men.

RELIGIOUS SERVICES.

The University, established by a government which recognizes no distinction of religious belief, seeks neither to promote any creed, nor to exclude any. By the terms of its charter, persons of any religious denomination or of no religious denomination are equally eligible to all offices and appointments, and it is expressly ordered that "at no time shall a majority of the board of trustees be of any one religious sect, or of no religious sect."

In the University Chapel—the gift of the Hon. Henry W.

Sage—religious services are held, and discourses delivered by eminent clergymen selected from the various Christian denomiations.

PHYSICAL CULTURE.

For the physical training and development of students there has been provided a Gymnasium, thoroughly equipped with baths and all necessary appliances for bodily culture. This is under the charge of an experienced physician, the Professor of Physical Culture and Director of the Gymnasium, who examines every student at his entrance and at stated intervals thereafter, learns the condition of his health, takes his physical measurements, and prescribes such exercises as may be required for his complete and symmetrical bodily development. The gymnasium is also open to all members of the University for voluntary exercise; but the Professor of Physical Culture is in constant attendance, and no student is suffered to indulge in hazardous or excessive athletic efforts, or to attempt any feat which in his individual case might be attended with risk. A supplementary gymnasium at the Sage College for the lady students, is conducted on the same general plan. In the physical training of the students the practical instruction in military science is found a valuable aid.

OFFICERS OF THE UNIVERSITY.

TRUSTEES.

* The Hon. Josiah B. Williams died Wednesday, September 26th, 1883, and George R. Williams, Esq., was elected in his place.

OFFICERS OF THE BOARD.

Henry W. Sage,	Chairman
William R. Humphrey,	Secretary
Emmons L. Williams,	Acting Treasurer

EXECUTIVE COMMITTEE.

Henry B. Lord, Chairman,
Andrew D. White,
Henry W. Sage,
George W. Schuyler,
Samuel D. Halliday,
William R. Humphrey,
Douglas Boardman,
Myndersè Van Cleef.
George R. Williams.

Emmons L. Williams, Secretary.

FACULTY.

ARRANGED, WITH THE EXCEPTION OF THE OFFICERS OF THE FACULTY, IN THE ORDER OF SENIORITY OF APPOINTMENT.

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Oct. 21—The Rt. Rev. Robert W. B. Elliott, D.D., Bishop of Western Texas.

Oct. 28—The Rev. Jesse B. Thomas, D.D., of Brooklyn, N. Y.

Nov. 4—President Henry A. Buttz, D.D., of Drew Theological Seminary.

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Nov. 18—The Rev. Howard Crosby, D.D., LL.D., of New York City.

Nov. 25—The Rev. Charles W. Homer, of Brooklyn, N. Y.

Dec. 2—The Rev. Newman Smyth, D.D., of New Haven, Conn.

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April 20—Professor Wm. J. Tucker, D.D., of Andover Theological Seminary.

April 27—The Rev. Robert Collyer, of New York City.

May 4—The Rev. J. M. Buckley, D.D., of New York City.

May 11—The Rev. Theodore T. Munger, D.D., of North Adams, Mass.

May 18—The Rev. C. H. Parkhurst, D.D., of New York City

May 25—President Augustus H. Strong, D.D., LL.D., of the Rochester Theological Seminary.

June 1—The Rev. Henry Ward Beecher, of Brooklyn, N. Y.

June 8—The Rev. Bishop Edward G. Andrews, D.D., of Washington, D. C.

June 15 (Baccalaureate Sermon)—The Rev. George R. Van De Water, of Brooklyn, N. Y.

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Iowa Agricultural College.	
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Patterson, Webster,	*Wilmington, Del.,*	Mech. Arts
Pearce, Otis Ezra,	*North Hannibal,*	Architecture
Percival, Francis Rollin,	*Somers, Conn.,*	Medical Prep.
Perkins, Albertus Delos,	*Little York,*	Arts
Perkins, Elma,	*Addison Hill,*	Optional
Pierce, Charles Hopkins,	*Forestville,*	Optional
Pierce, George Henry,	*Branchport,*	Architecture

Ransom, Charles Wellington,	*Ellenburg*,	Science and Letters
Rider, Ora Putnam,	*Parish*,	Optional
Ridge, Daniel Wamsley,	*Bustleton, Pa.*,	Optional
Riley, William Hermon,	*Wilmington, Del.*,	Mech. Arts
Romney, Joseph Mac Auslin,	*Salt Lake City, Utah*,	Sc. & Let.
Russell, Isaac Howard,	*Castile*,	Optional
Rutledge, Arthur,	*Rockford, Ill.*,	Civil Engineering
Ryder, Stephen,	*Carmel*,	Science and Letters
Sackett, John Thomas,	*Brooklyn*,	Science and Letters
Schlesinger, Mark Mayer,	*New York City*,	Sc. and Letters
Seeley, Florence Corinne,	*Rochester*,	Literature
Seymour, John Pliny,	*Ogdensburg*,	Mechanic Arts
Shepard, Frank William,	*Medina, O.*,	Civil Engineering
Sloan, Fred,	*Worcester*,	Science and Letters
Smith, Eva Anna,	*West Winfield*,	Sc. and Letters
Smith, Sidney Alvord,	*Herkimer*,	Science and Letters
Sprague, Daniel Darius, Jr.,	*Holley*,	Civil Engineering
Stanbrough, Lyman Truman,	*Owego*,	Science and Letters
Stoner, Stanley,	*Griggsville, Ill.*,	Sc. and Letters
Story, Charles Butts,	*Schultzville*,	Science and Letters
Summers, Henry Elijah,	*Rochester*,	Science and Letters
Sweet, Joseph Ferris,	*Throop*,	Optional
Taylor, Hobart Chatfield,	*Chicago, Ill.*,	Sc. and Letters
Thurber, Charles Herbert,	*Deckertown, N. J.*,	Philosophy
Tyler, Edward,	*Ithaca*,	Science and Letters
Upton, Wallace Lincoln,	*Clymer*,	Electrical Engineering
Veiga, Saturnino Ferreira da, Jr.,	*Rio Janeiro, Brazil*,	Civil Eng
Vischer, William Bentley,	*Wellington, O.*,	Natural History
Weil, Alphonse David,	*San Francisco, Cal.*,	Sc. and Let.
Wheeler, Amos,	*Ithaca*,	Optional
Wheeler, Fred Russell,	*Buffalo*,	Science and Letters
White, Charles David,	*Marion*,	Natural History
Wightman, Edward Daniel,	*Eden*,	Mathematics
Wing, Charles Benjamin,	*Willow Brook*,	Civil Eng.
Wood, Phœbe Jane,	*Portville*,	Science and Letters
Yawger, John Francis,	*Union Springs*,	Science and Let.

FRESHMEN.

Allendorf, Elbert,	*Poughkeepsie,*	Sc. and Letters
Alexander, Charles Doster,	*Prattville, Ala.,*	Optional
Alvord, Lucy,	*Johnstown,*	Arts
Aspinwall, John Judson,	*Troy, Pa.,*	Civil Engineering
Barrows, Kate Magee,	*Watkins,*	Optional
Barton, Lyman Guy,	*Willsborough,*	Mechanic Arts
Bellinger, Lyle Fred,	*Ilion,*	Civil Engineering
Benham, Anna Louise,	*Cortland,*	Optional
Bennett, De Villo Levi,	*Wellington, Ohio,*	Elect. Eng.
Bishop, Robert Hallam,	*Trumbull's Corners,*	Philosophy
Bodine, Donaldson,	*Lodi,*	Science and Letters
Boynton, Edward Carlisle, Jr.,	*Newburg,*	Mechanic Arts
Briesen, Julius von, Jr.,	*New York City,*	Civil Eng.
Brill, Gerow Dodge,	*Poquog,*	Agriculture
Browning, Charles, Jr.,	*Chatham,*	Mechanic Arts
Burr, Lucius Franklin,	*St. Johnsville,*	Sc. and Letters
Carr, Henry Low,	*Paterson, N. J.,*	Med. Prep.
Casey, George Whitman,	*Auburn,*	Architecture
Champion, Edward Willet,	*Goshen,*	Science and Letters
Chrisman, Francis Leon,	*Harrisburg, Pa.,*	Hist. & Pol. Sc.
Clark, Harry Willard,	*N. Andover, Mass.,*	Elect. Eng.
Coar, Thomas Edward,	*New York City,*	Civil Eng.
Cogswell, Arthur Clark,	*Cleveland, Ohio,*	Civil Eng.
Cohn, Morris, Jr.,	*Cobleskill,*	Science and Letters
Coles, Howard Lawrence,	*New Rochelle,*	Science and Let.
Coley, Harrison,	*New Woodstock,*	Sc. and Letters
Colnon, Redmond,	*Potsdam,*	Civil Engineering
Cooper, William,	*Evans' Mills,*	Mechanic Arts
Coray, George Quincy,	*Provo City, Utah,*	Optional
Cornell, Arthur Leland,	*Albany,*	Civil Engineering
Cornell, Ezra,	*Ithaca,*	Optional
Corser, Helen Henrietta,	*Minneapolis, Minn.,*	Optional
Covell, Grant,	*Springfield, Pa.,*	Mechanic Arts
Coville, Frederic Vernon,	*Oxford,*	Arts
Cox, James Lincoln,	*Norwich,*	Mechanic Arts
Curtis, Charles William,	*Washington, D. C.,*	Civil Eng.
Cutter, William Parker,	*Washington, D. C.,*	Anal. Chem.

Day, James Hallack, Jr.,	*Saybrook, Ct.*,	Civil Engineering
Deamer, John Ellsworth,	*Union City, Pa.*,	Mech. Arts
Dennis, John Bartlett,	*Gardiner, Me.*,	Science and Let.
Dibble, Arthur Jackson,	*Franklin*,	Optional
Dimon, Henry Goldsmith,	*Riverhead*,	Civil Engineering
Elliott, Elias Leavenworth,	*Glenora*,	Chemistry and Physics
Everitt, John Elmer,	*Burlington, Pa.*,	Medical Prep.
Flint, Buena Ventura Rufus,	*Rivas, Nicaragua*,	Mech. Arts
Franklin, Frank George,	*Plover, Wis.*,	Optional
Gifford, Arthur Warner,	*Little Utica*,	Civil Engineering
Gillis, William Davis,	*Kinsman, Ohio*,	Mechanic Arts
Gilmore, Victor Lee,	*New Iberia, La.*,	Agriculture
Godard, Harlow, 2d,	*Richville*,	Optional
Goodkind, Martin Henry,	*New York City*,	Sc. and Letters
Greenawalt, William Eckert,	*Silver Spring, Pa.*,	Civil Eng.
Gregory, Julia,	*Washington, D. C.*,	Sc. and Let.
Haley, William Daniel,	*Mongaup Valley*,	Optional
Hall, William Russell,	*Oates' Island, Tenn.*,	Sc. & Let.
Harris, Gilbert Dennison,	*Jamestown*,	Optional
Harris, William Mason,	*Owego*,	Civil Engineering
Hart, Emmet Ellsworth,	*Little Valley*,	Civil Engineering
Hays, Harry Thomas,	*Decatur, Ill.*,	Sc. and Letters
Hebard, Fred Whitmore,	*Woodville*,	Philosophy
Hebbard, William Sterling,	*Rochester*,	Architecture
Hedden, Edward,	*Ithaca*,	Civil Engineering
Hegewald, Arthur Frederick,	*New Albany, Ind.*,	Mech. Arts
Hess, Frank Judson,	*Rochester*,	Optional
Himes, Albert James,	*Oswego*,	Civil Engineering
Horr, Charles William,	*Wellington, Ohio*,	Sc. and Let.
Horrmann, Charles,	*Stapleton*,	Agriculture
Hungerford, Mary Gavina,	*Ithaca*,	Optional
Jenkins, Ralph,	*Newburg*,	Medical Preparatory
Jones, Clinton Irving,	*Groton*,	Optional
Keating, Langford Spencer,	*Buffalo*,	Science and Letters
Kelsey, Sidney Eugene,	*Stockholm Depot*,	Civil Eng.
Kingsley, George Pomroy,	*Freeport, Ill.*,	Optional
Kuykendall, Benjamin, Jr.,	*Towanda, Pa.*,	Sc. and Letters
Lawrence, Theodore Finch,	*Chester*,	Civil Engineering
Lee, Charles Kleber,	*Galveston, Texas*,	Optional

Lemcke, John Frederick,	*Cedar Grove, N. J.,*	Med. Prep.
Lent, Albert Swift,	*Wellsboro, Pa.,*	Optional
Lockwood, William Augustus,	*Fairport,*	Agriculture
Lynde, Arthur Lincoln,	*Antwerp,*	Civil Engineering
Maguire, Patrick James,	*Chateaugay,*	Optional
Marshall, George Montanye,	*Towanda, Pa.,*	Philosophy
Mathews, Edward William,	*Maynard,*	Civil Engineering
Mattison, John Albert,	*Sand Bank,*	Science and Letters
Maxon, Frank Ernest,	*Watertown,*	Civil Engineering
McAllister, Charles Albert,	*City Island,*	Mechanic Arts
McCall, Frank Elias,	*Bath,*	Arts
McCargo, Grant,	*Hulton, Pa.,*	Civil Engineering
McConnell, Edgar Bozde,	*Logansport, Ind.,*	Optional
McCulloch, Robert Lawton,	*Stevens' Point, Wis.,*	Sc. & Let.
Mead, Georgie Everett,	*Brewster,*	Optional
Meehan, John William,	*Fairport,*	Civil Engineering
Meloy, Fredrika Williams,	*Portville,*	Optional
Mercereau, Edward Keeler,	*Union,*	Civil Engineering
Merwin, Milton Knapp,	*Utica,*	Mechanic Arts
Miller, George Congdon,	*Elmira,*	Science and Letters
Moon, Jessie Hawkins,	*Newport,*	Optional
Moore, Frank Meredith,	*Syracuse,*	Philosophy
Moore, Veranus Alva,	*Parish,*	Science and Letters
Neale, Charles Thompson, Jr.,	*Pittsburg, Pa.,*	Mechanic Arts
Nettleton, James Burritt,	*Medina, Ohio,*	Architecture
Norton, Albert Julius,	*Utica,*	Architecture
Norton, George Harvey	*East Pembroke,*	Civil Eng.
O'Toole, James,	*Waterville,*	Science and Letters
Olmstead, Edward,	*Waverly,*	Medical Preparatory
Otis, Lois Macy,	*Sherwood,*	Science and Letters
Oviatt, Bordman Lambert,	*Shushan,*	Medical Preparatory
Oviatt, David Brainerd,	*Shushan,*	Mechanic Arts
Pelton, Gilbert Brace,	*Ilion,*	Civil Engineering
Perkins, Ella Gertrude,	*Addison Hill,*	Optional
Phillips, Albert,	*Newark, N. J.,*	Architecture
Pitcher, John Beardsley,	*Little Meadows, Pa.,*	Civil Eng.
Potter, Grant,	*Ithaca,*	Mechanic Arts
Pound, Cuthbert Winfred,	*Lockport,*	Optional

Pratt, George Lincoln,	*Fulton*,	Optional
Proctor, Alfred Stainbank,	*Denver*, *Col.*,	Civil Engineering
Race, Lewis Leyman,	*Decatur*, *Ill.*,	Science and Letters
Randall, Norman Benjamin,	*Stockport*,	Mechanic Arts
Richards, George Blackwell,	*Leavenworth*, *Kansas*,	Sc. & Let.
Roberts, Perry Buchanan,	*Ithaca*,	Optional
Romer, William Johnstone,	*Ithaca*,	Optional
Runner, Emma Avaline,	*Ithaca*,	Science and Letters
Russell, James Earl,	*Hamden*,	Optional
Rutherford, Robert Elmer,	*Binghamton*,	Optional
Ryan, Harris Joseph,	*Halifax*, *Pa.*,	Electrical Eng.
Ryther, George De Groot,	*Carthage*,	Mechanic Arts
Saal, George Frederick,	*Cleveland*, *Ohio*,	Sc. and Letters
St. John, Richard Collier,	*St. Catharine's*, *Canada*,	Civil Eng.
Sands, Herbert,	*Clyde*,	Civil Engineering
Sanford, Charles Van Wyck,	*Warwick*,	Science and Letters
Sanford, Ezra Terry,	*Warwick*,	Agriculture
Sargent, Erle Hoxsie,	*Medina*, *Ohio*,	Optional
Schaaf, Rudolph George,	*Newark*, *N. J.*,	Civil Eng.
Schreiner, John Charles, Jr.,	*Allegheny City*, *Pa.*,	Civil Eng.
Scribner, Erwin Earnest Eliphalet,	*Scriba*,	Science and Letters
Selmser, Kate Eveline,	*Waterloo*,	Optional
Sheldon, Morris Woodworth,	*Hornellsville*,	Optional
Smith, Edward Leroy,	*Binghamton*,	Science and Let.
Smith, Fred Bigelow,	*Tioga*, *Pa.*,	Optional
Smith, Harry Ezra,	*Pike*,	Mechanic Arts
Smith, Milton,	*Ellenville*,	Science and Letters
Smith, Wayland Hyatt,	*Philadelphia*, *Pa.*,	Optional
Stanbrough, Frank Truman,	*Owego*,	Civil Engineering
Stedman, John Moore,	*Brockport*,	Natural History
Sterling, Guy,	*Gambier*, *O.*,	Civil Engineering
Sternberger, Edwin,	*New York City*,	Sc. and Letters
Stewart, Neil, Jr.,	*York*,	Civil Engineering
Stone, Frank Elmer,	*Livonia*,	Civil Engineering
Stone, Walter Hitchcock,	*Sandusky*, *O.*,	Mechanic Arts
Sweet, Robert Vaughn,	*Throop*,	Medical Preparatory
Tarbell, Ed,	*North Lansing*,	Agriculture
Taylor, John Rodgers Meigs,	*Omaha*, *Neb.*,	Architecture

Taylor, John Waring,	*Corinth, Miss.*,	Sc. and Letters
Thomson, Fred William,	*Alexandria Bay*,	Optional
Thomson, John Fuller,	*Alexandria Bay*,	Sc. and Let.
Tomlinson, Thomas Wilbur,	*Logansport, Ind.*,	Optional
Turnbull, Thomas, Jr.,	*Syracuse*,	Optional
Van Meter, Charles Farragut,	*Rochester*,	Optional
Vedder, Herman Klock,	*St. Johnsville*,	Civil Engineering
Vega, Eugene Arsenio,	*Santander, Spain*,	Chem. & Phy.
Walton, William Heckman,	*Buffalo*,	Optional
Warner, Albert Rollin,	*Wellington, Ohio*,	Sc. and Let.
Warner, Monroe,	*Pulaski*,	Civil Engineering
Warner, Ralph Cossitt,	*Portville*,	Optional
Warner, Wilbert Charles,	*Sandy Creek*,	Natural History
Webb, Wirt Dickson,	*Syracuse*,	Civil Engineering
Weber, George Frederick,	*Lysander*,	Science and Letters
Wheeler, Metellus Clinton Woodbury,	*Peoria, Ill.*,	Mechanic Arts
White, Horace,	*Syracuse*,	Science and Letters
Wilbur, Royal Edwards,	*Carthage*,	Science and Letters
Wilkinson, Theodore Kirkland,	*Syracuse*,	Literature
Willard, Frederick Bush,	*Geneseo*,	Optional
Williams, Chauncey Grant,	*Ithaca*,	Electrical Engineering
Williams, Otis Lincoln,	*Ithaca*,	Electrical Engineering
Wilson, James Fountain,	*Menomonee, Wis.*,	Philosophy
Wright, Ellsworth David,	*Ithaca*,	Arts

SPECIAL STUDENTS.*

Byrne, Sarah,	*Englewood, Ill.*,	History & Lit.
Cameron, Edward Arthur,	*St. Louis, Mo.*,	Architecture
Copeland, Cecil Arthur,	*Monroe, Wis.*,	Veterinary Sc.
Galbraith, Lois Carrie,	*White House, Pa.*,	Literature
Green, William Clinton,	*Rochester*,	Architecture
Hand, Mary Jane,	*Addison*,	Natural History
Iles, Emma Elizabeth,	*Rochester*,	Chem. & Nat. History
Jermyn, John Samuel,	*Penshurst, Australia*,	Med. Prep.

* See page 37.

Nettleton, George William,	*Medina, Ohio,*	Architecture
Peck, Eugenia Caldwell,	*Homer,*	History and Literature
Ramsden, Ella Elizabeth,	*Dansville,*	History and Pol. Sc.
Simpson, Harold Granger,	*Columbus, O.,*	Hist. and Pol. Sc.
Tenney, Henry Allen,	*Worcester, Mass.,*	Mechanic Arts
Ward, George Henry,	*San Francisco, Cal.,*	Mech. Arts

SUMMARY.

RESIDENT GRADUATES,		21
LICENTIATE,		1
UNDERGRADUATES,		
Seniors,	66	
Juniors,	70	
Sophomores,	113	
Freshmen,	176	
Special,	14	
		439
Total,		461

ADMISSION AND CLASSIFICATION.

ENTRANCE EXAMINATIONS.

Examinations in all the subjects required for admission to the University are held *three* times in the year, as follows: 1. In June, at the end of the Spring term, Monday, Tuesday, and Wednesday preceding Commencement Day. 2. In September, at the beginning of the Fall term. 3. In January, at the beginning of the Winter term. The days will be found indicated in the Calendar. Special examinations of candidates for admission can be held at other times only by permission of the Faculty.

Candidates must be of good moral character and at least *sixteen* years of age, or, if women, *seventeen*.

Candidates for admission will obtain permits for examination at the Registrar's office, and the results of examinations may be ascertained from the Registrar.

I. The Primary or English Entrance Examinations.

All candidates for admission, except those provided with certificates or diplomas as specified below, are examined as follows:

1. In *English Grammar;* Whitney's Essentials of English Grammar is the standard. A short composition is required as a test of the candidate's knowledge of spelling, punctuation, the use of capitals, and elementary English construction.

If the candidate prefers, the subject for this composition will be assigned by the examiner from one of the books named below, and the knowledge of the subject matter shown will be duly regarded.

In 1883: Shakespeare's Julius Caesar, Bunyan's Pilgrim's Progress, Scott's Ivanhoe, Gray's Elegy.

In 1884: Shakespeare's Coriolanus, Thackeray's Henry Esmond, Irving's Sketch-Book, Longfellow's Evangeline.

In 1885: Shakespeare's Merchant of Venice, Scott's Lady of the Lake, Hawthorne's Twice-Told Tales, Lowell's Vision of Sir Launfal.

2. In *Geography*, political and physical; as much as is contained in Harper's School Geography, or in Warren's Common School Geography.

3. In *Physiology;* as presented in the smaller text-books upon the subject, exclusive of the nervous system and the names of bones and muscles.

4. In *Arithmetic*, including the metric system of weights and measures; as much as is contained in the larger text-books.

5. In *Plane Geometry;* as much as is contained in the first five books of Chauvenet's Treatise on Elementary Geometry, or in the first five books of Wentworth's Elements of Plane and Solid Geometry, or in the first six books of Newcomb's Elements of Geometry, or in the first six books of Hamblin Smith's Elements of Geometry.

6. In *Algebra*, through quadratic equations, and including radicals and the theory of exponents; as much as is contained in the first fourteen chapters of Loomis's Treatise on Algebra, or in Olney's Elementary Course in Algebra, or in the first five sections of Robinson's University Algebra, or in the first twenty-six chapters of Hamblin Smith's Elementary Algebra.

In Arithmetic, and in the fundamental operations of Algebra, such as multiplication and division, the management of brackets, the solving of numerical and literal equations of the first and second degree, the combining and simplifying of fractions and radicals, the interpretation and use of negative quantities and of 0 and ∞, the putting of problems into equation—the student should have distinct notions of the meaning and the reason of all that he does, and be able to state them clearly in his own language; he should also be able to perform all these operations, even when somewhat complex, with rapidity, accuracy, and neatness; and to solve practical problems readily and completely. In his preparatory study he is advised to solve a great many problems, and to state and explain the reasons for the steps taken. In Geometry he should learn the definitions accurately, whether in the language of the text-book or not, and in proving a theorem or solving a problem he should be able to prove every statement made, and to go back step by step till he rests upon the primary definitions and axioms. He should be able to apply the princi-

ples of geometry to practical and numerical examples, to construct his diagrams readily with rule and compass, and to find for himself the solutions of simple problems and the demonstrations of simple theorems. Besides oral recitation, he is advised to write out his demonstrations, having equal regard to the matter and to the form of his statements; and when written he may carefully study them to make sure, first, that he has a complete chain of argument, and, secondly, that it is so arranged that without defect or redundance one step follows as a logical consequence of another.

These examinations are held in the following order:

First Day.—9 A. M., Arithmetic; 11 A. M., Geography; 3 P. M., English Grammar.

Second Day.—9 A. M., Plane Geometry; 11.30 A. M., Physiology; 2.30 P. M., Algebra through Quadratics.

In place of these examinations certain certificates or diplomas are received as follows:

1. *Certificates* issued by the *Regents of the University* of the State of New York are accepted in place of the examinations in English Grammar, Geography, and Arithmetic.

2. *Certificates* issued by the *Superintendent of Public Instruction* of the State of New York, and *Diplomas* issued by the State normal schools, and by those academies and high schools of the State of New York whose requirements for graduation have been approved by the Faculty, and whose course of study requires Physiology and Plane Geometry, are accepted in place of the examinations in all the subjects named above *except Algebra.*

3. *Diplomas* issued by the *Regents* to graduates from the high schools and academies of the State of New York are accepted in place of the examinations in all the subjects named above.

Optional students are admitted to the University upon passage of the English Entrance or Primary Examinations; and for admission to the courses in *Agriculture, Architecture, Civil Engineering, Electrical Engineering,* and *Mechanic Arts,* only the Primary Examination is required.

II. Examinations for Admission to the Other Courses.

For admission to any other of the regular courses of study examinations *in addition to the Primary Examination* are required, as follows:

To the Courses in Science, Science and Letters, Mathematics, Chemistry and Physics, and Analytical Chemistry.

In addition to the English Entrance, an examination in *any one* of the following subjects:

1. In *French*, the principles of French Grammar, the translation of French at sight, the translation of English into French, and the equivalent of two of Bôcher's modern French plays and Lacombe's Petite Histoire du Peuple Français;

2. In *German*, the whole of Whitney's German Grammar, the translation of German at sight, the translation of English into German, and one hundred pages of Whitney's Reader, including two of the longer prose extracts or an equivalent;

Any deficiency in the preparatory French or German may be made up, as extra work, by reciting with the regular classes in the University.

Or the student may offer in *Mathematics*, Solid Geometry and Conic Sections, as much as is contained in Newcomb's Elements of Geometry; Advanced Algebra, as much as is contained in Olney's University Algebra, or in Newcomb's Algebra; and Trigonometry, Plane and Spherical, as much as is contained in Wheeler's Elements of Trigonometry, or in the unstarred portions of Oliver, Wait, and Jones's Treatise on Trigonometry.

To the Course in Natural History:

In addition to the Primary Examinations, as follows: 1. In *French* or *German*, as above. 2. In *Plane Trigonometry*, as above. 3. In *Latin*, four books of Cæsar's Commentaries or an equivalent, with a good knowledge of the grammar. 4. In *Greek*, the alphabet and enough of the language to enable the student to recognize, analyze, and form scientific technical terms.

To the Two-Year Course Preparatory to the Study of Medicine:

In addition to the Primary Examinations, as follows: 1. In *Plane Trigonometry*, as above. 2. In *Latin*, as above. 3. In *Greek*, as above.

To the Courses in Literature, Philosophy, and History and Political Science:

In addition to the Primary Examinations, as follows: 1. In *French* or *German*, or *Mathematics*, as above. 2. In *Latin*, as below. 3. In *Grecian* and *Roman History*, as below.

To the Course in Arts:

In addition to the Primary Examinations, as follows:

1. In *Greek*, candidates are expected to have read at least one hundred pages of Attic prose, and three books of Homer: they are examined (1) critically on what they have read; (2) in translating easy Greek at sight; and (3) in translating English into Greek.

2. In *Latin*, candidates are examined (1) in the following authors, with questions on subject-matter, constructions, and the formation and inflection of words: Cæsar, four books of the Gallic war, Virgil, the Eclogues and six books of the Æneid, with the prosody, Cicero, six Orations, including the four against Catiline; (2) in the translation at sight of passages of average difficulty from Cæsar and Cicero; and (3) in the translation into Latin of a piece of connected English based upon the principles and vocabulary contained in the first forty lessons of Allen's Introduction to Latin Composition.

3. In *Grecian* and *Roman History*, and the outlines of ancient geography; Fyffe's Primer of Greece, Creighton's Primer of Rome, and Tozer's Primer of Classical Geography will indicate the amount and method of study desired.

These additional examinations are held on the *third day*, as follows:

Third Day—8 A. M., Solid Geometry; 8 A. M., French; 9 A. M., Greek; 10.30 A. M., German; 10.30 A. M., Advanced Algebra; 2.30 P. M., Latin; 2.30 P. M., Trigonometry.

The examination in Grecian and Roman History is held at 8 A. M. on the *second day* of the examinations.

ADMISSION WITHOUT EXAMINATION.

Any person at least twenty-one years of age, and having satisfactory attainments, may be admitted by vote of the Faculty, without examination, *as a Special Student*, on the recommendation of the professor in charge of any department in which he is to take a large part of his work. Such students cannot be candidates for a degree or licentiate certificate; and their admission must be renewed every year.

CANDIDATES FROM OTHER COLLEGES.

Certificates of honorable dismissal from other colleges are re-

ceived in place of the *Primary Examinations* only, and when offered by candidates who *have passed at least one term's examinations* at the institution granting such dismissal. No person, whether from another college or not, is admitted to *advanced* studies except after examination as above stated.

ASSIGNMENT TO CLASSES.

Every student who intends to complete any one of the four year courses and graduate is assigned, on his admission to the University, to some one of the four annual classes; and no student will be allowed to pass from one to another of these classes until the work of the preceding year has been satisfactorily done.

Students who do not intend to complete any one of the four-year courses and graduate, are registered as "optional" in one of the four annual classes; but any student who has been registered as optional will be permitted to register in any one of the regular courses, on his completion of the work required for the standing which he proposes to take in that course.

ADMISSION TO ADVANCED STANDING.

Any student who has had in another college, or elsewhere, an equivalent to one or more of the years of any of the regular courses may, on presenting evidence satisfactory to the Faculty of his ability to go on with the class he proposes to enter, be admitted to an advanced standing in that course, at his admission to the University.

ADMISSION TO GRADUATE STUDY.

Students are admitted to graduate study after having taken a baccalaureate degree in the University, or on presenting the diploma of an equivalent degree conferred elsewhere; they are at liberty to attend lectures, recitations, or other exercises of undergraduates, and to use the library, museums, etc. They are expected to pursue some study of advanced character under the direction of a professor or of a special faculty.

RESIDENCE AND GRADUATION.

TERMS AND VACATIONS.

The Academic year is divided into three terms, and there are three vacations.

Commencement comes on the third Thursday in June.

The Fall Term begins on the Tuesday following the thirteenth day of September, and ends on the Friday after the sixteenth day of December, making a term of thirteen weeks and four days.

The Winter Term begins on the Tuesday next after the second day of January; except when, in leap year, that Tuesday would be the third day of January, in which case it will begin on the Tuesday after the third.

The Spring vacation extends from the noon of the Friday next after the twenty-third of March until the second Saturday following.

The Spring Term begins on the second Saturday after the close of the Winter Term; the instruction begins on the Monday following, and continues until Commencement; making in all thirty-six weeks of term-time in the academic year.

The beginning and ending of terms and vacations of each year, and other matters of detail relating to them, may be found in the Calendar.

REGISTRATION EACH TERM.

At the beginning of every term each student must obtain a Certificate of Registration before joining any class or attending any lecture; and no student, after having once been admitted to the University, will be allowed to register after the close of Registration Day, except on recommendation of the Committee on Absences, or by special permission of the Faculty.

EXERCISES OF THE TERM.

A printed schedule of the University exercises is issued each term. Every student must take the equivalent of at least fifteen hours of recitations a week, exclusive of military drill. Two and a half hours of laboratory work, or three hours of drafting or shop-work, are regarded as the equivalent of one recitation.

The regular examinations in all studies are held at the end of each term. Failure at examination entails forfeiture of position in the class, or exclusion from the course, or, in some cases, from the University. The *Course Book* affords the student an opportunity of preserving a record of his examinations.

PAYMENTS TO THE UNIVERSITY.

The fee for tuition is $25 a term, payable within ten days after registration.

Tuition is free to *State students*, to *resident graduates*, and to students pursuing the prescribed course in *Agriculture*, and *intending to complete* that course.

Every person taking laboratory work in chemistry, physics, zoölogy, or entomology must deposit with the Treasurer security for the materials to be used in the laboratory. Students residing in the University buildings must pay their room-bills one term in advance. All the members of the University are held responsible for any injury done by them to its property.

EXPENSES OF RESIDENCE.

The following is a fair estimate of the yearly expenses:

Tuition, $25 a term, - - - - - -	$ 75.00
Room, board, lights, fuel, and laundry, about - -	200.00
Text-books, etc., about - - - - - -	25.00
Total, - - - - - -	$300.00

The cost for board, rent of furnished room, fuel, and lights at the Sage College varies from $5 to $6.50 a week. A student occupying alone one of the best rooms pays $6.50 a week. If two occupy such a room together, the price is $5.75. Those occupying less desirable rooms, with two in a room, pay $5 a week each. The entire building is warmed by steam, and, in most cases, the sleeping apartment is separate from the study.

The expense of living in Ithaca varies, for board, room, fuel, and lights, from $4 to $7 a week. By the formation of clubs, students may reduce their expenses to $2.50 or $3.50 a week for board.

GRADUATION.

AL the courses leading to a degree require four years for their completion.

Any student who has been admitted to an advanced standing on his admission to the University, must pass the examinations required for that standing at the first opportunity after his admission. Or, after having been in the University for a year or more, and having sustained a good character, maintained a high standing in his classes, and approved himself for scholarship, such student may, by a vote of the Faculty, be admitted to some definite standing, such as his scholarship will entitle him to—the Faculty by this act accepting his studies elsewhere as equivalent to what he would have done here, if he had entered the University at the beginning of his collegiate course.

I. THE DEGREE OF BACHELOR.

The degrees of Bachelor of Arts, of Literature, of Philosophy, of Agriculture, of Architecture, of Civil Engineering, and of Mechanical Engineering are conferred after the satisfactory completion of the corresponding courses. The degree of Bachelor of Philosophy is also conferred after the satisfactory completion of the course in History and Political Science.

The degree of Bachelor of Science is conferred after the satisfactory completion of any one of the following courses: Science, Science and Letters, Chemistry and Physics, Analytical Chemistry, Electrical Engineering, Mathematics, and Natural History. The particular course is specified in the diploma.

The degree of Bachelor of Veterinary Science is conferred only after the completion of a full course of four years in that department.

No person may take more than one degree the same year.

Graduation Thesis.

Each student, before taking a degree, must submit to the Faculty a satisfactory oration, poem, or essay on some subject in

science, literature, or art, and deposit a copy in the Library. A successful thesis written for final honors may, at the student's option, be presented as his thesis for graduation.

A fee of $5, to cover expenses of graduation, degrees, etc., is charged to each person taking the baccalaureate degree. This fee must be paid before the degree is conferred.

Certificate of Licentiate.

Licentiate certificates and certificates of proficiency are conferred upon students who have pursued a special branch of knowledge and made distinguished proficiency therein. They are given upon the recommendation of the respective Faculties.

II. ADVANCED DEGREES.

Courses of study for graduates leading to advanced degrees are provided for in the following departments: Chemistry and Physics, Mathematics, Natural History; History and Political Science; Comparative Philology, Ancient Classical Languages and Literatures, Modern European Languages and Literatures, Oriental Languages and Literatures; Philosophy and Letters. Persons wishing to take an advanced degree in any of the above departments must apply to the Faculty to be admitted as candidates.

1. The Degree of Master.

The degree of Master of Arts or Master of Science is conferred on those who have taken the corresponding baccalaureate degree here, or wherever the requirements for that degree are equal to those of this University, on the following conditions:

1. The candidate must spend at least one year at the University in a course of study marked out for him by the Faculty, must present a satisfactory thesis, and pass an examination.

2. The same degrees are conferred without residence on graduates of this University only, on conditions the same as above, except that the degree is not given until three years after the baccalaureate degree has been conferred.

3. Graduates of this University may become candidates for either of the above second degrees by passing such additional examinations as are required for the corresponding first degree.

The degree of Master of Science is conferred on graduates in Philosophy on the same conditions as on graduates in Science.

2. The Degree of Civil Engineer.

The degree of Civil Engineer is conferred (1) on bachelors of Civil Engineering, after two years of study and practice, on passing the requisite examination and presenting a satisfactory thesis; (2) on those who have completed the five-year course.

3. The Degree of Doctor.

The degree of Doctor of Veterinary Medicine is conferred on bachelors of Veterinary Science, after two years of additional study, on passing the requisite examination.

The degree of Doctor of Philosophy is conferred on graduates of this University, and of other universities and colleges whose requirements for the baccalaureate degree are equal to those of this University, on the following conditions:

1. In order to become a candidate the applicant must have, over and above what is required for graduation in the course in Philosophy, a knowledge of Greek equal to that required for admission to the course in Arts.

2. The candidate must spend at least two years at the University pursuing a course of study marked out by the Faculty.

3. He must, at least six weeks before commencement, present a meritorious thesis upon some subject included in the course, and pass the requisite examination.

The degree of Doctor of Science is conferred on graduates of this University, and of other universities and colleges whose requirements for the baccalaureate degree are equal to those of this University, on the following conditions:

1. In order to become a candidate the applicant must have: a knowledge of Latin and Greek at least equal to that required for admission to the course in Natural History; a knowledge of French and German equal to that required for graduation in Science; a knowledge of mathematics, of science, of literature, and of philosophy equal to that required for graduation in Philosophy.

2. The candidate must spend at least three years, two of them at this University, in the study of not less than two scientific subjects approved by the Faculty, in one or more of the departments of Chemistry and Physics, Mathematics, and Natural History.

3. He must pass an examination upon these subjects, showing in one of them special attainments, and must present a meritorious

thesis based on special investigations, or make some other contribution to science.

Candidates for the degree of Doctor must print their theses and deposit ten copies in the Library. Candidates for other advanced degrees must deposit one copy.

No student in a graduate course is allowed to take two degrees for the same course, to take any inferior degree for any part of the study that leads to a higher one, or to be a candidate for more than one degree at the same time.

Candidates for a second degree must make application to the Registrar and present their theses at least twenty days before Commencement. The examinations for advanced degrees are held the second week before Commencement.

The fee charged for a second degree is $10, and must in all cases be paid to the Treasurer before the degree is granted.

COURSES OF STUDY.

GENERAL COURSES.

THE COURSE IN ARTS.

Leading to the Degree of Bachelor of Arts.

FRESHMAN YEAR.

FALL TERM.—Grecian history, 2; Greek, 3; Latin, 4; rhetoric, 2; geometry and conic sections, 5; military drill, 2; hygiene, six lectures.

WINTER TERM.—Roman history, 2; Greek, 3; Latin, 4; rhetoric, 2; algebra, 5.

SPRING TERM.—Roman history, 2; Greek, 3; Latin, 4; rhetoric, 2; trigonometry, 5; military drill, 2.

SOPHOMORE YEAR.

FALL TERM.—Greek, 3; Latin, 4; essays and declamations, 1; military drill, 2; *optional*, 7.

WINTER TERM.—Greek, 3; Latin, 4; essays and declamations, 1; *optional*, 7.

SPRING TERM.—Greek, 3; Latin, 4; military drill, 2; essays and declamations, 1; *optional*, 7.

JUNIOR YEAR.

FALL TERM.—Essays, 1; psychology, 2; *optional*, 12.

WINTER TERM.—Essays and orations, 2; moral philosophy, 2; *optional*, 11.

SPRING TERM.—Essays and orations, 2; logic, 3; *optional*, 10.

SENIOR YEAR.

FALL TERM.—Literature and oratory, 3; history of philosophy, 3; *optional*, 9.

WINTER TERM.—Literature and oratory, 3; military science, 2; *optional*, 12.

Spring Term.—Literature and oratory, 1; *optional*, 11; thesis. Students electing *chemistry* must continue the study through the two terms.

THE COURSE IN LITERATURE.

Leading to the Degree of Bachelor of Literature.

FRESHMAN YEAR.

Fall Term.—Grecian history, 2; French *or* German, 3; Latin, 4; rhetoric, 2; geometry and conic sections, 5; military drill, 2; hygiene, six lectures.

Winter Term.—Roman history, 2; French *or* German, 3; Latin, 4; rhetoric, 2; algebra, 5.

Spring Term.—Roman history, 2; French *or* German, 3; Latin, 4; rhetoric, 2; trigonometry, 5; military drill, 2.

SOPHOMORE YEAR.

Fall Term.—Anglo-Saxon, 3; French *or* German, 5; Latin, 4; essays and declamations, 1; physiology, 3; military drill, 2.

Winter Term.—Anglo-Saxon, 3; French *or* German, 5; Latin, 4; essays and declamations, 1; *optional*, 3.

Spring Term.—Anglo-Saxon, 3; French *or* German, 5; Latin, 4; essays and declamations, 1; botany, 3; military drill, 2.

JUNIOR YEAR.

Fall Term.—Early English, 3; English literature, general course, 3; Italian *or* Spanish, 2; essays, 1; psychology, 2; Latin, modern languages, *or* science, 4.

Winter Term.—Early English, 3; English literature, general course, 3; Italian *or* Spanish, 2; essays and orations, 2; moral philosophy, 2; Latin, modern languages, *or* science, 4.

Spring Term.—Early English, 3; English literature, general course, 3; Italian *or* Spanish, 2; essays and orations, 2; logic, 3; Latin, modern languages, *or* science, 4.

SENIOR YEAR.

Fall Term.—English literature, special course, 2; literature and oratory, 3; history of philosophy, 3; Latin, modern languages, *or* science, 7.

Winter Term.—English literature, special course 2; literature and oratory, 3; philosophy of history, 3; military science, 2; Latin, modern languages, *or* science, 7.

Spring Term.—English literature, special course, 2; literature and oratory, 1; American law, 5; Latin, modern languages, *or* science, 4; preparation of thesis.

THE COURSE IN PHILOSOPHY.

Leading to the Degree of Bachelor of Philosophy.

FRESHMAN YEAR.

Fall Term.—French *or* German, 5; Latin, 4; rhetoric, 2; geometry and conic sections, 5; military drill, 2; hygiene, six lectures.

Winter Term.—French *or* German, 5; Latin, 4; rhetoric, 2; algebra, 5.

Spring Term.—French *or* German, 5; Latin, 4; rhetoric, 2; trigonometry, 5; military drill, 2.

SOPHOMORE YEAR.

Fall Term.—French *or* German, 3; essays and declamations, 1; analytical geometry, 5; experimental mechanics and heat, 3; zoölogy, lectures and laboratory work (vertebrates), 3; military drill, 2.

Winter Term.—French *or* German, 3; essays and declamations, 1; electricity and magnetism, 3; chemistry, lectures, 3; zoölogy, lectures and laboratory work (invertebrates), 3; Latin, modern languages, mathematics, *or* science, 3.

Spring Term.—French *or* German, 3; essays and declamations, 1; acoustics and optics, 3; chemistry, lectures, 3; botany, 3; military drill, 2; Latin, modern languages, mathematics, *or* science, 3.

JUNIOR YEAR.

Fall Term.—English literature, 3; essays, 1; physics *or* chemistry, laboratory work, 3; geology, 3; psychology, 2; languages, mathematics, *or* science, 4.

Winter Term.—English literature, 3; essays and orations, 2; descriptive astronomy, 3; physics *or* chemistry, laboratory work, 3; moral philosophy, 2; mathematics, languages *or* science, 3.

Spring Term.—English literature, 3; essays and orations, 2; physical astronomy, 3; physics *or* chemistry, laboratory work, 3; logic, 3; languages, mathematics, *or* science, 2.

SENIOR YEAR.

Fall Term.—Literature and oratory, 3; history of philosophy, 3; *optional*, 9.

Winter Term.—Literature and oratory, 3; philosophy of history, 3; military science, 2; *optional*, 9.

Spring Term.—Literature and oratory, 1; American law, 5; *optional*, 6; preparation of thesis.

Students in Philosophy may take the Grecian and Roman history of the first year as an extra study and receive credit therefor towards graduation.

THE COURSE IN SCIENCE.

Leading to the Degree of Bachelor of Science.

FRESHMAN YEAR.

Fall Term.—French, 5, and German, 3, *or* German, 5, and French, 3; rhetoric, 2; geometry and conic sections, 5; military drill, 2; hygiene, six lectures.

Winter Term.—French, 5, and German, 3, *or* German, 5, and French, 3; rhetoric, 2; algebra, 5; linear drawing, 2.

Spring Term.—French, 5, and German, 3, *or* German, 5, and French, 3; trigonometry, 5; descriptive geometry, text and drawing, 4; military drill, 2.

SOPHOMORE YEAR.

Fall Term.—French *or* German, 3; essays and declamations, 1; analytical geometry, 5; experimental mechanics and heat, 3; zoölogy, lectures and laboratory work (vertebrates), 3; military drill, 2.

Winter Term.—French *or* German, 3; essays and declamations, 1; electricity and magnetism, 3; chemistry, lectures, 3; zoölogy, lectures and laboratory work (invertebrates), 3; chemistry *or* zoölogy (invertebrates), laboratory work, 3.

Spring Term.—French *or* German, 3; essays and declamations, 1; acoustics and optics, 3; chemistry, lectures, 3; blowpipe analysis, 2; botany, 3; military drill, 2.

JUNIOR YEAR.

Fall Term.—English literature, 3; essays, 1; physics, laboratory work, 3; organic chemistry, 2; geology, 3; *optional* five

hours, of which at least three must be given to one of the following sciences: *botany*, *chemistry* (including *mineralogy*), *zoölogy*.

Winter Term.—English literature, 3; essays and orations, 2; descriptive astronomy, 3; physics, laboratory work, 3; economic geology, 3; *optional*, three hours, which must be given to one of the following sciences: *botany*, *chemistry*, *zoölogy*.

Spring Term.—English literature, 3; essays and orations, 2; physical astronomy, 3; physics, laboratory work, 3; *optional*, five hours, of which at least three must be given to one of the following sciences: *botany*, *chemistry*, *geology*, *zoölogy*.

SENIOR YEAR.

Fall Term.—*Optional*, fifteen hours, of which at least eight must be given to two of the following sciences (three or five hours to each): *botany*, *chemistry*, *geology*, *zoölogy*.

Winter Term.—Political economy, 2; military science, 2; *optional*, thirteen hours, subject to the same conditions as in the fall term.

Spring Term.—Constitution of the United States, twelve lectures; *optional*, eleven hours, subject to the same conditions as in the fall term; preparation of thesis.

The optional hours not required for science in the junior and senior years may be devoted to either scientific, literary, historical, or philosophical subjects. In electing their studies in science for the junior and senior years, students must take at least the minimum given throughout the year of each science chosen.

Students taking the physics of the senior year must have had the calculus of the sophomore year; those taking the geology of the senior year must have had the blowpipe determination of minerals of the sophomore year.

THE COURSE IN SCIENCE AND LETTERS.

Leading to the Degree of Bachelor of Science.

FRESHMAN YEAR.

Fall Term.—French, 5, and German, 3, *or* German, 5, and French, 3; rhetoric, 2; geometry and conic sections, 5; military drill, 2; hygiene, six lectures.

Winter Term.—French, 5, and German, 3, *or* German, 5, and French, 3; rhetoric, 2; algebra, 5.

SPRING TERM.—French, 5, and German, 3, *or* German, 5, and French, 3; rhetoric, 3; trigonometry, 5; military drill, 2.

SOPHOMORE YEAR.

FALL TERM.—French *or* German, 3; essays and declamations, 1; physiology, 3; experimental mechanics and heat, 3; zoölogy, lectures and laboratory work (vertebrates), 3; modern languages, mathematics *or* science, 2; military drill, 2.

WINTER TERM.—French *or* German, 3; essays and declamations, 1; electricity and magnetism, 3; chemistry, lectures, 3; zoölogy, lectures and laboratory work (invertebrates), 3; modern languages, mathematics, *or* science, 2.

SPRING TERM.—French *or* German, 3; essays and declamations, 1; acoustics and optics, 3; chemistry, lectures, 3; botany, 3; modern languages, mathematics, *or* science, 2; military drill, 2.

JUNIOR YEAR.

FALL TERM.—English literature, 3; essays, 1; psychology, 2, geology, 3; *optional*, 7.

WINTER TERM.—English literature, 3; essays and orations, 2; descriptive astronomy, 3; moral philosophy, 2; *optional*, 6.

SPRING TERM.—English literature, 3; essays and orations, 2; physical astronomy, 3; logic, 3; *optional*, 5.

SENIOR YEAR.

FALL TERM.—Literature and oratory, 3; history of philosophy, 3; *optional*, 9.

WINTER TERM.—Literature and oratory, 3; philosophy of history, 3; military science, 2; *optional*, 9.

SPRING TERM.—Literature and oratory, 1; American law, 5; *optional*, 6; preparation of thesis.

SPECIAL AND TECHNICAL COURSES.

THE COURSE IN AGRICULTURE.

Leading to the Degree of Bachelor of Agriculture.

FRESHMAN YEAR.

FALL TERM.—French *or* German, 5; rhetoric, 2; geometry and conic sections, 5; freehand drawing, 3; military drill, 2; hygiene, six lectures.

WINTER TERM.—French or German, 5; rhetoric, 2; algebra, 5 freehand drawing, 3.

SPRING TERM.—French *or* German, 5; rhetoric, 2; trigonometry, 5; agricultural chemistry, lectures and laboratory work, 3; military drill, 2.

SOPHOMORE YEAR.

FALL TERM.—French *or* German, 3; experimental mechanics and heat, 3; agricultural chemistry, 5; zoölogy, lectures and laboratory work (vertebrates), 3; anatomy, laboratory work, 2; military drill, 2.

WINTER TERM.—French *or* German, 3; electricity and magnetism, 3; agricultural chemistry, lectures, 4; chemistry, qualitative analysis, 5; anatomy, laboratory work, 2.

SPRING TERM.—French *or* German, 3; acoustics and optics, 3; land surveying, 4; botany, lectures, 3, field-work, 2; blowpipe analysis and determinative mineralogy, 2; military drill, 2.

JUNIOR YEAR.

FALL TERM.—Botany, compositæ and gramineæ, 3; arboriculture and landscape gardening, 2; geology 3; veterinary anatomy and physiology, 5; botany *or* chemistry, laboratory work, 3.

WINTER TERM.—Chemistry, quantitative analysis, 6; vegetable physiology, 3; vegetable histology, 2; veterinary pathology, sanitary science and parasites, 5.

SPRING TERM.—Chemistry, quantitative analysis, 7; entomology, lectures, 2, laboratory work, 2; veterinary medicine and surgery, 5.

SENIOR YEAR.

FALL TERM.—Agriculture, lectures, 5, field-work, 3; fungi and algæ, 4; principles of horticulture, 2; entomology, laboratory work, 3.

WINTER TERM.—Agriculture, lectures, 5, field-work, 2; systematic and applied botany, 3; botany *or* chemistry, laboratory work, 5; military science, 2.

SPRING TERM.—Agriculture, lectures, 3, field-work, 3; building materials and construction, 2; American law, 5.

THE COURSE IN ARCHITECTURE.

Leading to the Degree of Bachelor of Architecture.

FRESHMAN YEAR.

Fall Term.—French *or* German, 5; rhetoric, 2; geometry and conic sections, 5; freehand drawing, 3; linear drawing, 1; military drill, 2; hygiene, six lectures.

Winter Term.—French *or* German, 5; rhetoric, 2; algebra, 5; freehand drawing, 3; projection and tinting, 1.

Spring Term.—French *or* German, 5; trigonometry, 5; descriptive geometry, text and drawing, 4; botany, 3; military drill, 2.

SOPHOMORE YEAR.

Fall Term.—French *or* German, 3; composition and elocution, 1; analytical geometry, 5; descriptive geometry, text and drawing, 6; experimental mechanics and heat, 3; military drill, 2.

Winter Term.—French *or* German 3; composition and elocution, 1; calculus, 5; drawing, 3; electricity and magnetism, 3; chemistry, lectures, 3.

Spring Term.—French *or* German, 3; composition and elocution, 1; drawing, 1; acoustics and optics, 3; chemistry, lectures, 3; blowpipe analysis and determinative mineralogy, 2; building materials and construction, 3; military drill, 2.

JUNIOR YEAR.

Fall Term.—Mechanics, strength of materials, 3; shades, shadows, and perspective, 3; drawing, 3; Egyptian, Greek, and Roman architecture, 3; designing, 4.

Winter Term.—Mechanics, trusses, 3; Byzantine and Romanesque architecture, 5; designing, 3; construction, 2; economic geology, 3.

Spring Term.—Mechanics, arches, 3; freehand drawing, 3, Gothic architecture, 5; designing, 3; construction, 2.

SENIOR YEAR.

Fall Term.—Renaissance architecture, 3; decoration, 3; designing, 6; stereotomy, 3.

Winter Term.—Modern architecture, 3; designing, 7; stereotomy applied to stone-cutting, 5; military science, 2.

Spring Term.—Acoustics, ventilation, warming, professional practice, measuring, contracts, specifications, etc., 5; designing, 7.

THE COURSE IN ANALYTICAL CHEMISTRY.

Leading to the Degree of Bachelor of Science.

FRESHMAN YEAR.

FALL TERM.—French, 5, and German, 3, *or* German, 5, and French, 3; rhetoric, 2; geometry and conic sections, 5; military drill, 2; hygiene, six lectures.

WINTER TERM.—French *or* German, 5; rhetoric, 2; algebra, 5; chemistry, lectures, 3, laboratory work, 3.

SPRING TERM.—French *or* German, 5; rhetoric, 2; trigonometry, 5; chemistry, lectures, 3, laboratory work, 3; military drill, 2.

SOPHOMORE YEAR.

FALL TERM.—Analytical geometry, 5; experimental mechanics and heat, 3; organic chemistry, 2; chemistry, laboratory work, 8; military drill, 2.

WINTER TERM.—Electricity and magnetism, 3; chemistry, laboratory work, 15.

SPRING TERM.—Acoustics and optics, 3; physics, laboratory work, 3; chemistry, laboratory work, 9, blowpipe analysis, 3; military drill, 2.

JUNIOR YEAR.

FALL TERM.—Chemical philosophy, 3; chemistry, laboratory work, 9; mineralogy, 3; geology, 3.

WINTER TERM.—Chemical philosophy, 3; chemistry, laboratory work, 9; assaying, 3; economic geology, 3.

SPRING TERM.—Chemical philosophy, 3; chemistry, laboratory work, 15.

SENIOR YEAR.

FALL TERM.—Chemistry, laboratory work, 18.

WINTER TERM.—Chemistry, laboratory work, 18; military science, 2.

SPRING TERM.—Chemistry, laboratory work, 15; preparation of thesis.

THE COURSE IN CHEMISTRY AND PHYSICS.

Leading to the Degree of Bachelor of Science.

FRESHMAN YEAR.

FALL TERM.—French, 5, and German, 3, *or* German, 5, and French, 3; rhetoric, 2; geometry and conic sections, 5; military drill, 2; hygiene, six lectures.

WINTER TERM.—French, 5, and German, 3, *or* German, 5, and French, 3; rhetoric, 2; algebra, 5.

SPRING TERM.—French, 5, and German, 3, *or* German, 5, and French, 3; rhetoric, 2; trigonometry, 5; military drill, 2.

SOPHOMORE YEAR.

FALL TERM.—French *or* German, 3; essays and declamations, 1; analytical geometry, 5; experimental mechanics and heat, 3; chemistry, laboratory work, 3; military drill, 2.

WINTER TERM.—French *or* German, 3; electricity and magnetism, 3; chemistry, lectures, 3; laboratory work, 8.

SPRING TERM.—French *or* German, 3; acoustics and optics, 3, chemistry, lectures, 3, blowpipe analysis, 3; botany, 3; military drill, 2.

JUNIOR YEAR.

FALL TERM.—Organic chemistry, 2; mineralogy, 3; chemistry and physics, laboratory work, 9; *optional, science*, 3.

WINTER TERM.—Chemical philosophy, 3; metallurgy, 2; chemistry and physics, laboratory work, 9; *optional, science*, 3.

SPRING TERM.—Chemical philosophy, 3; chemistry and physics, laboratory work, 11; *optional, science*, 3.

SENIOR YEAR.

FALL TERM.—Chemical journals, 1; history of philosophy, 3; chemistry and physics, laboratory work, 10; *optional, science*, 3.

WINTER TERM.—Chemical journals, 1; metallurgy, 2; chemistry and physics, laboratory work, 9; military science, 2; *optional, science*, 3.

SPRING TERM.—Chemical journals, 1; chemistry and physics, laboratory work, 12; preparation of thesis.

Of the laboratory work of the junior and senior years not less than four hours must be given to chemistry each term, and not less than four hours to physics.

THE COURSES IN CIVIL ENGINEERING.

I. A FOUR-YEAR COURSE.

Leading to the Degree of Bachelor of Civil Engineering.

FRESHMAN YEAR.

FALL TERM.—French *or* German, 5; rhetoric, 2; geometry and conic sections, 5; freehand drawing, 3; military drill, 2; hygiene, six lectures.

WINTER TERM.—French *or* German, 5; rhetoric, 2; algebra, 5; freehand drawing, 3; linear drawing, 2.

SPRING TERM.—French *or* German, 5; trigonometry, 5; descriptive geometry, text and drawing, 4; botany, 3; military drill, 2.

SOPHOMORE YEAR.

FALL TERM.—French *or* German, 3; analytical geometry, 5; descriptive geometry, text and drawing, 6; experimental mechanics and heat, 3; military drill, 2.

WINTER TERM.—French *or* German, 3; calculus, 5; pen topography, 2; tinting and shading, 2; electricity and magnetism, 3; chemistry, lectures, 3.

SPRING TERM.—Calculus, 5; land surveying, 4; acoustics and optics, 3; chemistry, lectures, 3; blowpipe analysis, 1; technical essays, 1; military drill, 2.

JUNIOR YEAR.

FALL TERM.—Calculus, 5; mineralogy, 2; shades, shadows, and perspective, 3; topographical mapping and sketching, 2; lettering, 1; kinematics, *or* physics, laboratory work, 3; technical essays, 1.

WINTER TERM.—Mechanics of engineering, 5; detail drawing and graining, 2; physics, laboratory work, 3; metallurgy, 2; economic geology, 3; technical essays, 1.

SPRING TERM.—Mechanics of engineering, 5; railroad surveying, 5; colored topography, 3; lettering, 2; technical essays, 1.

SENIOR YEAR.

FALL TERM.—Mechanics of engineering, 5; spherical astronomy, 5; practical astronomy, night observations, 2; Egyptian, Greek, and Roman architecture, *or* physics, laboratory work, 3; stereotomy and original problems, 3; civil engineering, 2; technical essays, 1.

WINTER TERM.—Hydraulics, 5; higher geodesy, 5; bridge stresses, 2; stone-cutting and original problems and practice, 5; technical essays, 1; military science, 2.

SPRING TERM.—Hydraulic motors, 2; civil engineering, 3; engineering economy, 2; bridge stresses, 5; hydrographic surveying, chart-making, and geodesy, field-work, 3; technical essays, 1; preparation of thesis.

Students in the courses in civil engineering are required to write essays upon professional subjects; and these essays are

read and discussed at the weekly meetings of the Civil Engineering Association.

II. A FIVE-YEAR COURSE.

Leading to the Degree of Civil Engineer.

The first four years are the same as in the four-year course. The choice of *optionals* in the fifth year is subject to the approval of the head of the department.

Students in the fifth year pay no tuition fees and have all the privileges of resident graduates.

FIFTH YEAR.

Fall Term.—Riparian rights and law of contracts, 3; bridge construction and details, 3; projects, designs, and specifications, 3.

Optional, 9: Grecian history, 2; modern history, 3; psychology, 2; American history, 3; physiology and zoölogy, 6; languages, 2; technical reading, 2; renaissance architecture, 3; chemistry, laboratory work, 3; engineering, laboratory work, 3; physics, laboratory work, 3; rock drills and air compressors, 3; the steam-engine, 3; mining projects, 3; geology, 3; mineralogy, 3; mathematics, 3.

Winter Term.—River and harbor improvements, 3; advanced astronomy and geodesy, 3; technical reading, 2; projects, designs, and specifications, 2.

Optional, 8: Roman history, 2; American history, 3; political economy, 2; languages, 2; pure or applied mathematics, 5, zoölogy, 3; metallurgy, 3; chemistry, laboratory work, 3; engineering, laboratory work, 3; physics, laboratory work, 3; Romanesque architecture, 3; the steam-engine, 3; mining projects, 2; geology, 3.

Spring Term.—Sanitary engineering, 3; locomotive machines, etc., 3; projects, designs, and specifications, 2.

Optional, 6: Roman history, 2; modern history, 2; American history, 3; languages, 3; pure or applied mathematics, 4; historical or technical reading, 3; geology, 3; chemistry, laboratory work, 3; engineering, laboratory work, 3; physics, laboratory work, 3; Gothic architecture, 3; pumps and small machinery 2: mining projects, 4; arch ribs, 3; geodesy, field-work.

THE COURSE IN ELECTRICAL ENGINEERING.

Leading to the Degree of Bachelor of Science.

FRESHMAN YEAR.

FALL TERM.—French *or* German, 5; rhetoric, 2; geometry and conic sections, 5; freehand drawing, 3; military drill, 2; hygiene, six lectures.

WINTER TERM.—French *or* German, 5; rhetoric, 2; algebra, 5; freehand drawing, 3; instrumental drawing, 2.

SPRING TERM.—French *or* German, 5; trigonometry, 5; descriptive geometry, text and drawing, 4; rhetoric, 2; military drill, 2.

SOPHOMORE YEAR.

FALL TERM.—French *or* German, 3; analytical geometry, 5; experimental mechanics and heat, 3; descriptive geometry, text and drawing, 6; military drill, 2.

WINTER TERM.—French *or* German, 3; calculus, 5; electricity and magnetism, 3; chemistry, lectures, 3; shop-work, 3.

SPRING TERM.—Calculus, 5; acoustics and optics, 3; chemistry, lectures, 3; mechanical drawing, 3; shop-work, 3; military drill, 2.

JUNIOR YEAR.

FALL TERM.—Calculus, 5; physics, laboratory work (mechanics, measurements), 3; chemistry, laboratory work, 3; mechanism, 3: shop-work, 3.

WINTER TERM.—Mechanics of engineering, 5; physics, laboratory work (electricity, general experiments), 3; chemistry, laboratory work, 3; mechanism, 3; shop-work, 3.

SPRING TERM.—Mechanics of engineering, 5; physics, laboratory work (acoustics and optics), 5; chemistry, laboratory work, 3; mechanical drawing, 3.

SENIOR YEAR.

FALL TERM.—Mechanics of engineering, 5; physics, lectures and laboratory work (testing of instruments and determinations of constants), 6; steam-engine, 3; mechanical drawing, 3.

WINTER TERM.—Physics, lectures and laboratory work (dynamo machines and electrical motors, tests of efficiency), 5; steam-engine, 3; hydraulics, 5; mechanical drawing, 4; military science, 2.

SPRING TERM.—Physics, lectures and laboratory work, (photometry, tests of electric lamps, telegraph instruments, telegraph lines, and cables), 9; mechanical drawing, 3; preparation of thesis.

THE COURSE IN MATHEMATICS.

Leading to the Degree of Bachelor of Science.

FRESHMAN YEAR.

FALL TERM.—French *or* German, 5; rhetoric, 2; geometry and conic sections, 5; freehand drawing, 3; military drill, 2; hygiene, six lectures.

WINTER TERM.—French *or* German, 5; rhetoric, 2; algebra, 5; freehand drawing, 3; linear drawing, 2.

SPRING TERM.—French *or* German, 5; rhetoric, 2; trigonometry, 5; descriptive geometry, text and drawing, 4; military drill, 2.

SOPHOMORE YEAR.

FALL TERM.—Analytical geometry, 5; mathematical essays, 1; experimental mechanics and heat, 3; descriptive geometry, text and drawing, 6; essays and declamations, 1; military drill, 2.

WINTER TERM.—Calculus, 5; projective geometry, French textbook, 4; mathematical essays, 1; electricity and magnetism, 3; chemistry, 3; essays and declamations, 1.

SPRING TERM.—Calculus, 5; mathematical essays, 1; acoustics and optics, 3; chemistry, 3; botany, 3; essays and declamations, 1; military drill, 2.

JUNIOR YEAR.

FALL TERM.—Calculus and analytical geometry, 5; mathematical essays, 1; physics, laboratory work, 3; shades, shadows, and perspective, 3; essays, 1; *optional, not mathematics*, 3.

WINTER TERM.—Differential equations, 5; descriptive astronomy, 3; mathematical essays, 1; physics, laboratory work, 3; essays and orations, 2; *optional, not mathematics*, 3.

SPRING TERM.—Differential equations and finite differences, 5; physical astronomy, 3; mathematical essays, 1; physics, laboratory work, 3; essays and orations, 2: *optional, not mathematics*, 3.

SENIOR YEAR.

FALL TERM.—Imaginaries and elliptic functions, 3; mécanique analytique, 2; quaternions, *or* modern methods in analytical ge-

ometry, *or* applied mathematics, 4; mathematical essays, 1; English literature, 3; *optional, not mathematics*, 3.

WINTER TERM.—Imaginaries and elliptic functions, 3; mécanique analytique, 2; quaternions, *or* modern methods in analytical geometry, *or* applied mathematics, 4; mathematical essays, 1; English literature, 3; military science, 2; *optional, not mathematics*, 3.

SPRING TERM.—Imaginaries and elliptic functions, 3; mécanique analytique, 2; mathematical essays, 1; English literature, 3; Constitution of the United States, twelve lectures; *optional, not mathematics*, 3; preparation of thesis.

THE COURSE IN NATURAL HISTORY.

Leading to the Degree of Bachelor of Science.

FRESHMAN YEAR.

FALL TERM.—French, 5, and German, 3, *or* German, 5, and French, 3; rhetoric, 2; chemistry, laboratory work, 3; freehand drawing, 3; military drill, 2; hygiene, six lectures.

WINTER TERM.—French, 5, and German, 3, *or* German, 5, and French, 3; rhetoric, 2; chemistry, lectures, 3; freehand drawing, 3.

SPRING TERM.—French, 5, and German, 3, *or* German, 5, and French, 3; chemistry, lectures, 3, laboratory work, 3; freehand drawing, 2; military drill, 2.

SOPHOMORE YEAR.

FALL TERM.—French *or* German, 3; essays and declamations, 1; experimental mechanics and heat, 3; physiology, 3; zoölogy, lectures and laboratory work (vertebrates), 3; anatomy, laboratory work, 2; anatomical technology, 1; military drill, 2.

WINTER TERM.—French *or* German, 3; essays and declamations, 1; electricity and magnetism, 3; zoölogy, lectures and laboratory work (invertebrates), 3; laboratory work in physiological anatomy and histology, 5; microscopical technology, 1.

SPRING TERM.—French *or* German, 3; essays and declamations, 1; acoustics and optics, 3; blowpipe analysis, 1; botany, lectures, 3, field-work, 2; anatomy, laboratory work, 2; museum methods and experimental technology, 1; military drill, 2.

JUNIOR YEAR.

FALL TERM.—Essays, 1; psychology, 2; physics, laboratory

work, 2; chemistry, organic, *or* laboratory work, 2; mineralogy, 2; botany, 2; compositæ and gramineæ, lectures and laboratory work, 3; geology, 3.

WINTER TERM.—Essays and orations, 1; descriptive astronomy, 3; physics, laboratory work, 2; systematic and applied botany, *or* vegetable physiology, 3; vegetable histology, 2; economic geology, 3; laboratory work, 2.

SPRING TERM.—Essays and orations, 1; logic, 3; physical astronomy, 3; entomology, lectures, 2; geology, laboratory or field work, 3; *optional*, 4, in any two of the following subjects: physics, laboratory work, 2; botany, higher cryptogams, 2; comparative anatomy of the brain, 2; entomology, laboratory or field work, 2.

SENIOR YEAR.

FALL TERM.—History of philosophy *or* modern history, 3; botany, fungi, 4; palæontology *or* geology, laboratory and field work, 3; *optional*, 6, which may be devoted to any branch of natural history, including veterinary science.

WINTER TERM.—Modern history, 3; systematic and applied botany *or* vegetable physiology, 3; palæontology, lectures, 2, laboratory work, 3; military science, 2; *optional*, 5, which may be devoted to any branch of natural history, including veterinary science.

SPRING TERM.—Modern history, 2; palæontology, laboratory work, 3; *optional*, 9, which may be devoted to the preparation of a thesis, or to any branch of natural history, including veterinary science.

A TWO-YEAR COURSE PREPARATORY TO THE STUDY OF MEDICINE.

Not Leading to a Degree.

FRESHMAN YEAR.

FALL TERM.—French, 5; freehand drawing, 3; experimental mechanics and heat, 3; zoölogy, lectures and laboratory work (vertebrates), 3; physiology, 3; military drill, 2; hygiene, six lectures.

WINTER TERM.—French, 5; electricity and magnetism, 3; chemistry, lectures, 3, laboratory work, 3; zoölogy, lectures and laboratory work (invertebrates), 3.

Spring Term.—French, 5; acoustics and optics, 3; chemistry lectures, 3; botany, lectures, 3, laboratory work, 2; military drill, 2.

SOPHOMORE YEAR.

Fall Term.—German, 5; psychology, 2; organic chemistry, 2; anatomy, physiology, and hygiene of domestic animals, 5; anatomical technology, 1; anatomy, laboratory work, 2; military drill, 2.

Winter Term.—German, 5; vegetable physiology, 3; veterinary pathology, parasites, and sanitary science, 5; microscopical technology, 1; histology, laboratory work, 2; vegetable physiology, laboratory work, 2.

Spring Term.—German, 5; medical chemistry, 3; comparative anatomy of the brain, 2; anatomy, laboratory work, 2; museum methods and experimental technology, 1; veterinary medicine and surgery, 5; military drill, 2.

Upon the completion of this course, or its equivalent, the student is entitled to a certificate countersigned by the professor of physiology. These certificates usually exempt the holders from one of the three years of study under the direction of a physician, commonly required for graduation in medicine.

THE COURSE IN HISTORY AND POLITICAL SCIENCE.

Leading to the Degree of Bachelor of Philosophy.

The first two years of this course are regarded as mainly introductory to the studies which peculiarly belong to the general subjects of the course. Students who have completed the first two years in either of the courses in Arts, Literature, or Philosophy, may be admitted to full standing as juniors in the course in History and Political Science on passing a satisfactory examination in the History required in the first two years in this course.

Besides the prescribed work, lectures are given on important topics connected with the general subjects of the course by non-resident professors and lecturers; and these lectures, whenever given, must be attended by all the students in the course.

FRESHMAN YEAR.

Fall Term.—French *or* German, 5; Latin, 4; rhetoric, 2; geometry and conic sections, 5; military drill, 2.

Winter Term.—French *or* German, 5; Latin, 4; rhetoric, 2; algebra, 5.

Spring Term.—Pre-historic times, 2; French *or* German, 5; Latin, 4; rhetoric, 2; plane trigonometry, 3; military drill, 2.

SOPHOMORE YEAR.

Fall Term.—Grecian history, 2; English history, 3; French, 3; German, 3; essays and declamations, 1; Greek, Latin, modern languages, mathematics, *or* natural sciences, 3; military drill, 2.

Winter Term.—Roman history, 2; English history, 3; French, 3; German, 3; essays and declamations, 1; Greek, Latin, modern languages, mathematics, *or* natural sciences, 3.

Spring Term.—Roman history, 2; English history, 3; French, 3; German, 3; essays and declamations, 1; theory of probabilities and statistics, 3; military drill, 2.

JUNIOR YEAR.

Fall Term.—American history, 3; English constitutional history, or systematic politics, 5; mediæval and modern history, 3; psychology, 2; sanitary science, labor laws, and penal discipline, or *optional*, 2.

Winter Term.—American history, 3; modern history, 3; political economy, 2; moral philosophy and political ethics, 2; essays and orations, 2; *optional*, 3.

Spring Term.—American history, 3; modern history, 2; political economy, 2; logic, 3; essays and orations, 2; *optional*, 3.

SENIOR YEAR.

Fall Term.—American history, 3; modern history, 3; English constitutional history, or systematic politics, 5; history of philosophy and the natural sciences, 3.

Winter Term.—American history, 3; modern history, 3; philosophy of history, 3; international law, 5; military science, 2.

Spring Term.—American history, 3; modern history, 2; American law and jurisprudence, 5; finance and political economy, 5; preparation of thesis.

THE COURSE IN MECHANIC ARTS.

Leading to the Degree of Bachelor of Mechanical Engineering.

FRESHMAN YEAR.

Fall Term.—German, 5; geometry and conic sections, 5; free-hand drawing, 3; shop-work, 3; military drill, 2.

WINTER TERM.—German, 5; algebra, 5; freehand drawing, 3; instrumental drawing, 2; shop-work, 3.

SPRING TERM.—German, 5; trigonometry, 5; descriptive geometry, text and drawing, 4; shop-work, 3; military drill, 2.

SOPHOMORE YEAR.

FALL TERM.—German, 3; rhetoric, 2; analytical geometry, 5 experimental mechanics and heat, 3; shop-work, 3; military drill, 2.

WINTER TERM.—German, 3; rhetoric, 2; calculus, 5; electricity and magnetism, 3; mechanical drawing, 2; shop-work, 3.

SPRING TERM.—Calculus, 5; mechanical drawing, 4; building materials, 3; shop-work, 3; military drill, 3.

JUNIOR YEAR.

FALL TERM.—Calculus and analytical geometry, 5; descriptive geometry, text and drawing, 6; mechanism, 3; shop-work, 3.

WINTER TERM.—Mechanics of engineering, 5; mechanism, 3; physics, laboratory work, 3; chemistry, lectures, 3; shop-work, 3.

SPRING TERM.—Mechanics of engineering, 5; mechanical drawing, with shades, tinting, and perspective, 3; physics, laboratory work, 3; chemistry, lectures, 3; shop-work, 3.

SENIOR YEAR.

FALL TERM—Mechanics of engineering, 5; mechanical and working drawings, 3; physics, laboratory work, 3; steam-engine, 3; shop-work, 3.

WINTER TERM.—Mechanical drawing, 4; steam-engine, 3; metallurgy, 2; experimental work with indicators, governors, pumps, and injectors, 3; shop-work, 3; military science, 2.

SPRING TERM.—Graphical statics, 3; the use of instruments and field work, 3; chemistry, 3; technical reading and preparation of thesis, 3; shop-work, 3.

GRADUATE COURSE.

FALL TERM.—Machines for regulating, counting, etc., 3; mechanical *or* physical experiments, *or* chemistry, 3; riparian laws, contracts, patent-office laws, etc., 2. *Optional*, 7.

WINTER TERM.—Machine for change of form, 3; mechanica *or* physical experiments, *or* chemistry, 3; technical reading, 2 *Optional*, 7.

SPRING TERM.—Locomotive machines, hoists, cranes, etc., 3; mechanical *or* physical experiments, *or* chemistry, 3; shop systems and accounts, 2. *Optional*, 7.

The optional studies are hydraulics, assaying, blow-pipe analysis and mineralogy, chemistry (laboratory work), physics, (acoustics and optics), motors other than steam, architecture, civil engineering, shop-work, mathematics, botany, French, rhetoric, history, literature.

GENERAL DEPARTMENTS OF INSTRUCTION.

Any person wishing more detailed information than is given in the Register as to courses of study, methods of instruction, etc., may address the professor in charge of the department to which his inquiries relate.

AGRICULTURE.

I. APPLIED AGRICULTURE.

The requirements for admission to the course in Agriculture are such as to put the advantages which it offers within the reach of every young man who has made good use of the instruction afforded in the public schools. The instruction is given by lectures and recitations, illustrated with the aid of the Auzoux models and various other collections belonging to the University. Besides the class-room exercises, the student devotes as much time as can be spared to practiee in the botanical, chemical, and veterinary laboratories, as well as in the fields and barns.

In Applied Agriculture, five hours a week, during the senior year, are devoted to technical instruction in all its leading, and most of its minor, branches. The student is also required to spend three hours a day, two days in each week, in field work, and in the handling and feeding of domestic animals; and if this amount of practice does not prove sufficient to make him familiar with the various operations of the farm, additional time is required during the summer vacation.

The instruction by lectures begins with the senior year, and continues through the three terms of that year.

Fall Term: Wheat—culture, varieties, preparation of the soil,

seeding, injurious insects, harvesting, threshing, marketing; Swine—the history of breeds, feeding, general management, piggeries; Farm Buildings—location, plans, material, construction, repairs and preservation, contracts, liabilities of contractors; Fields—shape and size; Fences and Gates—construction, number, kind, repairs, durability of wood used; Farm and public roads, bridges, and culverts—location, construction, repairs; Farms—selection and purchase with regard to remoteness or nearness to markets, agricultural capabilities, roads, improvements, schools, and society; Titles, deeds, judgments, and mortgages; Farm-Yard Manures—composition, manufacture, preservation, application; Commercial Fertilizers—composition, application, utility.

Winter Term: Farm Accounts; Principles of Stock-breeding—law of similarity, of variation as caused by food, habit and climate, atavism, relative influence of male and female, prepotency, sex, in-and-in breeding, crossing and out-crossing, grading up or breeding in line; Races and Breeds—pedigrees, leading breeds of neat animals treated as to history, markings, characteristics, and adaptation to uses, soil, climate, and locality; Breeding, feeding, and management of cattle; Butter, cheese, and milk dairies, and beef production; Sheep Husbandry treated in detail same as cattle.

Spring Term: The Horse—breeds and breeding, education, care, driving, stables; Farm Drainage—mapping of drains, material, construction, utility; Plows and plowing; Farm Implements and, Machinery—use, care, and repairs; Corn, oat, barley, and flax culture; Grasses and forage plants; Weeds and their eradication; Business customs, rights, and privileges; Notes, contracts, and obligations; Employment and direction of laborers.

UNIVERSITY FARM.

The Farm consists of 120 acres of arable land, the larger part of which is used for experimental purposes and the illustration of the principles of agriculture. Nearly all the domestic animals are kept to serve the same ends. Those portions of farm and stock not used for experiments are managed with a view to their greatest productiveness. Statistics of both experiments and management are kept on such a system as to show at the close of each year the profit or loss not only of the whole farm but of each crop and group of animals. Of the two barns with

which the farm is equipped, one is largely devoted to the needs of the Horticultural Department; the other, containing steam-engine, feed-cutter, stationary thresher, and other necessary appliances, furnishes accommodation for the general crops and stock, and for experimental work.

II. AGRICULTURAL CHEMISTRY.

The study of Agricultural Chemistry comprises lectures and analytical practice in the laboratory. The lectures, seventy-five in number, embrace the following general subjects:

The general principles of chemical science, accompanied by introductory laboratory work; the chemistry of the elements and their compounds that constitute soils, plants, and animals; investigators in agricultural chemistry, their methods and means of working, and the literature of agricultural chemistry; the chemistry of vegetable life, and the production of vegetable substance in general; the physical and chemical properties and agricultural resources of the soil; tillage, drainage, etc., and amendments and manures; the composition of crops and other materials used for fodder; animal chemistry and nutrition; fermentation and putrefaction; milk and its manufactured products and residues; food, water, and air in their relations to human and animal life; the chemical analysis of fodder and food; farm crops and their manufactured products and residues.

The analysis of agricultural materials and products is treated in a course of chemical practice, as described under the head of Analytical Chemistry.

III. ECONOMIC ENTOMOLOGY.

The course comprises lectures, laboratory work, and field practice. There are two lectures per week during the spring term. In these lectures the characters of the orders, sub-orders, and the more important families are discussed; and especial attention is given to the study of the species which are of economic importance.

The laboratory and field work extends through two terms. In this part of the course the student is taught to determine species; and to make and prepare for publication original observations on the habits and structure of insects. For further details regarding the instruction in Entomology see this subject under the general head of Natural History.

Entomological Cabinet and Laboratory.

The entomological cabinet contains, in addition to many exotic insects, specimens of a large proportion of the more common species of the north-eastern United States. These specimens are arranged in two collections: one biological, containing specimens illustrative of the metamorphoses and habits of insects; the other systematic, in which the species are arranged so as to show their zoölogical affinities.

The Laboratory is equipped with a set of Auzoux models, microscopes, breeding cages, and other apparatus necessary for practical work in entomology.

IV. HORTICULTURE.

The instruction comprises two courses of lectures during the fall term, supplemented by experimental or practical work.

Junior Year: A course of lectures upon arboriculture and landscape gardening.

Senior Year: A course of lectures upon the principles of horticulture.

Additional time is given to experimental work in the garden or conservatories. The instruction in botany, both in the laboratory and in the several courses of lectures, is intended to afford a scientific basis for the special instruction given in horticulture.

Special students in agriculture, not candidates for a degree, are received for one, two or three years. Such students must devote at least two-thirds of their time to studies immediately connected with agriculture.

V. VETERINARY SCIENCE.

The regular course for students in Agriculture, Natural History, etc., embraces: five lectures a week during an entire academic year; laboratory work on the bones, clastic models, pathological preparations, and parasites of domestic animals; clinical instruction on cases occurring in practice.

Fall Term: Lectures on the anatomy and physiology of the animals of the farm. Attention is given to the principles of hygiene as affected by genus, breed, climate, soil, exposure, buildings, ventilation, drainage, food, and water; to the varying anatomical peculiarities which imply special aptitude for particular

uses; to the data for determining age; to the principles of breeding, of shoeing, etc.

Winter Term: Lectures on general comparative pathology; on specific fevers and other contagious diseases; on the parasites and parasitic diseases of domestic animals; and on constitutional diseases. An important feature in this course is the subject of veterinary sanitary science and police, embracing, as it does, the prevention of animal plagues by legislative and individual action, the improvement of unhealthy localities; and the destruction of animal poisons and parasites which are intercommunicable between man and the domestic animals.

Spring Term: Lectures on the local diseases of the various systems of organs in the different animals, and on veterinary surgery.

Opportunities are afforded to students who desire it to pursue the study of Veterinary Medicine and Surgery farther than is provided for in the regular courses of study.

Veterinary Museum.

The Museum embraces the following collections:

1. The Auzoux veterinary models, comprising clastic models of the horse, showing the relative position of over three thousand anatomical parts; models and limbs, sound and with detachable pieces and their morbid counterparts, illustrating changes in diseases of the bones, joints, muscles, etc.; a set of obstetrical models, showing the virgin and gravid uterus in different animals, and the peculiarities of the female pelvis and its joints; models of the gastric cavities of domestic animals; an extensive set of models of jaws, showing the indications of age as well as of vicious habits and diseases; models and equine teeth in sections, showing structure and the changes effected by wear.

2. Skeletons of the domestic animals, articulated and unarticulated.

3. A collection of diseased bones, illustrating the various constitutional diseases which impair the nutrition of these structures, together with the changes caused by accidental injuries and purely local disease.

4. Skulls of domestic animals, prepared to illustrate the surgical operations demanded in the different genera.

5. Jaws of farm animals, illustrating the growth and wear o. the teeth, age, dentinal tumors, caries, etc.

6. A collection of specimens of teratology, consisting of monstrous foals, calves, and pigs.

7. A collection of tumors and morbid growths removed from the different domestic animals.

8. Some hundreds of specimens of parasites from domestic animals.

9. A collection of calculi from the digestive and urinary organs, etc., of farm animals.

10. Foreign bodies taken from various parts of the animal economy.

11. A collection of surgical instruments used in veterinary practice.

12. A collection of medicinal agents.

13. In addition, a large number of diagrams, the property of Professor Law, available in illustration of different points in anatomy, physiology, and pathology.

For the Course in Agriculture see page 50.

ARCHITECTURE.

The Course in Architecture is so arranged as to give the student instruction in all subjects which he should understand in order to enter upon the practice of the art.

The instruction is given by means of lectures and practical exercises. Its object is not merely to develop the artistic powers of the student, but to lay that foundation of knowledge without which there can be no true art. Drawing is taught during the first two years, and afterwards thoroughly used and applied in mechanics, stereotomy, and designing.

Architectural mechanics occupies a part of each term for one year. The lectures are each supplemented by at least two hours of work on problems. In developing the subjects and in solving problems, analytical methods are used, but for practical use special attention is paid to the application of graphical statics.

The study of the history of architecture and the development of the various styles runs through five terms. The lectures are illustrated by photographs, engravings, drawings, casts, and models.

Proper attention is paid to acoustics, ventilation, heating, decoration, contracts, and specifications. The whole ground of education in architecture, practical, scientific, historical, and æsthetic, is covered as completely as is practicable in a four-year course.

"Satisfactory attainments" for "special students" in Architect ure will be as follows: Proficiency in all the branches of a good common-school education, in algebra and geometry, and in instrumental drawing. They must present themselves promptly at the beginning of the fall term of each year, and will not be admitted at any other time.

EQUIPMENT.

The White Architectural Library contains over one thousand volumes, and the photographic gallery nearly two thousand prints, all accessible to the student. Several hundred drawings, and about two hundred models in wood and stone, have been prepared to illustrate the constructive forms and peculiarities of the different styles.

For the Course in Architecture see page 52.

FREEHAND DRAWING.

Instruction in Freehand Drawing is given by means of lectures and general exercises from the blackboard, from flat copies, and from models. The work embraces a thorough training of the hand and eye in outline drawing, elementary perspective, model and object drawing, drawing from casts, and sketching from nature.

The effort is not to make mere copyists, but to render the student familiar with the fundamental principles underlying this art, and to enable him to represent any object correctly and rapidly. The course is largely industrial, and the exercises are arranged, as far as possible, with special reference to the drawing required in the work of the different departments.

All students in the departments of Agriculture, Architecture, Civil Engineering, Electrical Engineering, Mechanic Arts, Mathematics, and Natural History devote two hours a day to freehand drawing during the first two terms of the freshman year; and students in Architecture, in addition, two hours a day during one term of the junior year. Students in the other courses may take drawing as an optional study.

EQUIPMENT.

The department has a large collection of studies of natural and conventional forms, both shaded and in outline; of geometrical models, and of papier-maché and plaster casts, including a num-

ber of antique busts, casts of parts of the human figure, studies from nature, and examples of historical ornament.

CHEMISTRY AND PHYSICS.

I. PHYSICS.

The instruction comprises a general course of lectures designed as an introduction to the study of the subject, an elementary laboratory course designed to give a general knowledge of the science, and an advanced laboratory course.

The general course occupies one year, the exercises consisting of two experimental lectures and one recitation weekly. The subjects are pursued as follows: fall term, experimental mechanics and heat; winter term, electricity and magnetism; spring term, acoustics and optics. A knowledge of mathematics through plane trigonometry is required for registration in either of the subjects; and for registration in electricity and magnetism or in acoustics and optics, a knowledge of experimental mechanics and heat is also required.

The general course is required of all students except those in History and Political Science, Arts, and Literature; but those in Mechanic Arts do not take acoustics and optics.

The elementary laboratory course consists of a series of simple experiments arranged to perfect and fix the student's knowledge of physical facts and laws, and at the same time give him some experience in physical manipulation. The course occupies seven and a half hours a week (equivalent to three hours of lectures) for one year. Considering the very elementary character of the general course, this is the minimum time that can be devoted to the work with profit to the student. The elementary laboratory course is required of all students in Mechanic Arts, Chemistry and Physics, Science, and Mathematics, and parts of it are required of those in Civil Engineering and Natural History.

Students are admitted to the laboratory to pursue only such subjects as they have completed in the general course of lectures.

The advanced laboratory course consists of a series of experiments for the establishment of physical laws and the determination of constants. Many of these experiments involve the most refined methods of measurement. Students entering this course are expected to devote to it at least seven and a half hours a

week. They may enter for one or more terms at their option, and may, within certain limits, elect the line of work they wish to pursue. Special students will devote a part of their time to an original investigation.

The elementary laboratory course described above is required for admission to the advanced course. A knowledge of analytical geometry and calculus will also be found very useful.

APPARATUS.

Ample rooms expressly designed for laboratory work are available. The collection includes a fine gravity escapement clock, a chronograph for measuring tenths of seconds, and another for measuring short intervals of time to the ten-thousandth of a second, two cathetometers, a dividing engine, a large spectrometer reading to seconds, a set of apparatus for electrical measurements, a set of apparatus for heat measurements, Bjerkness's apparatus to show the analogy between magnetic phenomena and the phenomena of bodies vibrating in a fluid, besides a large collection of illustrative apparatus.

II. DESCRIPTIVE AND THEORETICAL CHEMISTRY.

The instruction begins with lectures on inorganic chemistry in the winter term of the sophomore year, and continues through two terms. Three lectures a week are given on the theoretical principles and the general study of the chemistry of inorganic bodies. During the fall term of the junior year, a course of lectures is given on the chemistry of organic bodies. In addition to the final examination at the end of the term, occasional examinations are held during the term, of which no previous notice is given, the students being expected to hold themselves in readiness for such an examination at all times.

For laboratory instruction in this branch of the subject a course of introductory practice is given in the spring term of the sophomore year. This course is required of students in Science, and of those in Chemistry and Physics, in Analytical Chemistry, and in Agriculture; it is required, further, of all students who take chemical practice as an optional study, in the beginning of their practice, except those who can give only the minimum time (seven and a half hours a week) for two or three terms, and who for sufficient reasons desire to devote all that time to chemical

analysis. This introductory practice consists in the performance by the student of a series of experiments illustrating the more important general principles of the science. The details of the manipulation of each experiment are carefully described, but the results to be obtained are not given. For the better cultivation of the student's powers of observation he is required to observe and describe these results for himself, and trace their connection with the principles which they are intended to illustrate.

The instruction in theoretical chemistry is continued in the courses in Chemistry and Physics, and in Analytical Chemistry by recitations in chemical philosophy, and by lectures on organic chemistry.

For the Course in Chemistry and Physics see page 53.

III. MINERALOGY AND METALLURGY.

Blowpipe Analysis.—During the spring term of the sophomore year, instruction is given in qualitative blowpipe analysis, and in determinative mineralogy. The course is designed to enable the student to avail himself of the simple and effective means which the blowpipe affords in determining the nature of unknown substances. The work in determinative mineralogy comprises the identification of minerals by observation of their hardness, fusibility, blowpipe reactions, etc., and constitutes a necessary preparation for the study of systematic mineralogy and lithology. The laboratory of blowpipe analysis and mineralogy in the new chemical and physical building is supplied with all necessary conveniences for the aid of students in this department.

Mineralogy.—The study of systematic mineralogy is pursued during the fall term of the junior year, and comprises lectures, conferences, and the study of specimens. The study of crystallography forms an important part of the course in mineralogy, and includes lectures illustrated by a complete set of glass models, as well as laboratory practice in the identification of crystalline forms from blocks and actual specimens. Exceptional advantages for the study of mineralogy are offered by the large and well-arranged Silliman collection of minerals, which is accessible to students at all times. A complete and carefully selected students' collection affords abundant material for work in determinative mineralogy. Special attention is given to the more important metallic ores, as a preparation for the studies of economic geology and metallurgy.

Assaying.—A thorough course of practice in assaying is given during the winter term of the junior year. Students are required to determine the value of gold, silver, and other metals contained in ores sufficient in number to make them familiar with the most approved methods in use in the West and in European mining regions. The assay of gold and silver bullion, as practiced in the national mints, forms a part of the course. The assay laboratory in the new building is equipped with every requisite for work in this branch, such as furnaces, tools, balances, etc.

Metallurgy.—During the winter term of the junior year two lectures a week are devoted to metallurgy. These lectures are intended to give the students in the technical courses a general idea of fuels, ores, and the most important methods of extracting the metals which are especially used in construction, the metallurgy of iron naturally claiming the most attention.

Optional Work.—Students pursuing courses in which blowpipe analysis, mineralogy, and assaying are not required, and who desire to pursue these studies as optional work, can take them only during the terms to which they are assigned in the schedule of the technical courses, and in the order indicated above. Thus, no one is admitted to work in blowpipe analysis who has not attended the lectures on inorganic chemistry; further, no one is admitted to the advanced class in mineralogy or assaying, or to the class in lithological laboratory work in the geological department, who has not completed one term's work in blowpipe analysis.

IV. AGRICULTURAL AND ANALYTICAL CHEMISTRY.

The general subject of Agricultural Chemistry is treated in a series of about seventy-five lectures, for an account of which see page 67.

The course in Analytical Chemistry, beginning in the sophomore year, comprises qualitative and quantitative analysis both in the wet way and in the dry way (blowpipe analysis and assaying), and is adapted in respect to length and completeness to the course of study the student is pursuing.

In Chemistry and Physics the qualitative analysis in the wet way and the blowpipe analysis are taken in the first two terms, beginning with the winter term of the sophomore year; this work may or may not, according to the proficiency attained in

these two terms, extend into the following term. In connection with the quantitative analysis, which occupies at least a large part of the time devoted to laboratory work in the junior and senior years of this course, some practice in qualitative analysis is continued.

The quantitative work begins with general practice in the determination of bases and acids by gravimetric and volumetric methods, after which follow the analysis of minerals, ores and technical products in the wet way, and dry assaying, organic, ultimate, and proximate analysis, the analysis of gaseous mixtures, the chemical examination of water and articles of food, spectroscopic analysis, the preparation of substances, and, finally, the thesis for graduation, to which most of the time of the last two terms of the course should be devoted.

In the course in Agriculture, the analytical part of agricultural chemistry begins in the fall term of the sophomore year, and comprises analysis in the wet way and with the blowpipe; it is confined to those substances that may occur in agricultural materials and products. The qualitative analysis should be completed in two terms of this year, so that all the time given to the subject in the junior and senior years may be devoted to quantitative analysis. This quantitative work begins, as in Chemistry and Physics, with general practice in the determination of bases and acids by gravimetric and volumetric methods. The chemical examination of fertilizers, soils, and agricultural products occupies the remainder of the course.

In the Medical Preparatory Course, a short course of qualitative and quantitative analysis in the wet way is given, which may carry the student far enough to qualify him to examine animal liquids by chemical methods for assistance in the diagnosis of disease. The amount of practice necessary for acquiring merely the rudiments of chemical analysis renders it impracticable to accomplish more than this in the time allotted in the course. Students intending to study medicine who have more time for chemical practice can take a longer and more thorough course, which includes a better foundation in quantitative work, and a wider application of the proficiency thus gained to the chemical examination of animal substances and articles of food and drink, and to medical jurisprudence.

Chemical Laboratory.

The new building for the department of Chemistry and Physics, completed during the summer of 1883, and now fully occupied, contains a museum, a library, laboratories, and lecture-rooms, and is thoroughly equipped with the most recent and approved appliances for the proper prosecution of the work of the department.

For the Course in Analytical Chemistry see page 53.

CIVIL ENGINEERING.

The instruction is given by means of lectures and recitations, with drafting, and field and laboratory work. The field work embraces the usual operations and the more recent methods of land, railroad, and subterranean surveying, together with hydrography and geodetic practice; and since 1874 the department of Civil Engineering has been engaged in the surveys of the hydrographic basin of central New York, as a contribution to the geodetic surveys of the United States Government.

Laboratory work is provided in chemistry, mineralogy, metallurgy, geology, physics, and civil engineering.

The students of this department receive instruction in an extended course of mechanics, as applied to engineering, and their professional preparation comprises the following subjects: the location and construction of railroads, canals, and water-works; the construction of foundations, in water and on land, and of superstructures and tunnels; the surveys, improvements, and defenses of coasts, harbors, rivers, and lakes; the determination of astronomical co-ordinates; the application of mechanics, graphical statics, and descriptive geometry to the constructions of the various kinds of right and oblique arch bridges, roofs, trusses and suspension bridges; the design, construction, and application of wind and hydraulic motors, air, electric, and heat engines, and pneumatic works; the drainage of towns and the reclaiming of lands; the preparation of plans and specifications, and the proper selection and tests of the materials used in constructions. As a part of their instruction, students have frequent practice in the preparation of papers on subjects of professional importance.

An elementary course of lectures is given in engineering and mining economy, finance, and jurisprudence.

To meet the growing demand for special training, the five-year course has been arranged, allowing considerable option and diver-

sity of studies to students wishing to pursue special lines of study in bridge architecture, or in railroad, mining, topographical, sanitary, geographical, electrical, or industrial engineering.

The five-year course also offers lines of continuous study of a historical, literary, and scientific character, which may alternate with the prescribed studies, and with architecture, general science, and technology.

As stated elsewhere, students in these courses are required to write essays upon professional subjects.

EQUIPMENT.

The special library of the department possesses many valuable works, among them the extensive publications recently presented to it by the French government; and in addition, the resources of the general library are available for the purposes of the department. The engineering laboratories contain various machines, models, and appliances for engineering investigations.

The engineering museums contain the following collections, which receive regular additions from a yearly appropriation:

1. The Muret collection of models in descriptive geometry and stone-cutting.
2. The De Lagrave general and special models in topography, geognosy, and engineering.
3. A nearly complete collection of the Schroeder models in descriptive geometry and stone-cutting, with some of the Olivier models, and others made at the University.
4. The Grund collections of bridge and track details, roofs, and trusses, supplemented by similar models by Schroeder and other makers.
5. A complete railroad bridge of one-hundred-foot span, the model being one-fourth of the natural scale.
6. The Digeon collection of working models in hydraulic engineering.
7. Several collections of European photographs of engineering works during the process of construction; and many other photographs, diagrams, and models.
8. Instruments of precision for astronomical work: a Troughton & Simms's transit, a universal instrument by the same makers reading to single seconds, three sextants, two astronomical clocks, chronographs, chronometers, two small equatorials, the larger of

four and a half inch aperture, made by Alvan Clark, and other instruments necessary to the equipment of a training observatory.

9. For geodetic work, a secondary base-line apparatus, made under the direction of the Coast and Geodetic Survey, and all the portable astronomical and field instruments needed, including sounding machines, deep-water thermometers, heliotropes, etc.

10. Among the coarser field instruments nearly every variety of engineers' transits, theodolites, levels, compasses, omnimeters, and tacheometers, with a large number of special instruments, such as planimeters, pantographs, elliptographs, arithmometers, tachometers, pocket altazimuths and sextants, hypsometers, and meteorological instruments of all descriptions.

For the Course in Civil Engineering see page 54.

ELECTRICAL ENGINEERING.

The rapid development of the applications of electricity has created a demand for thoroughly trained engineers conversant with electrical science, especially by companies carrying on telegraphy, electrical lighting, electrical supply and transmission of power, electroplating, or the manufacture of electrical machinery and apparatus. Recognizing this demand, at the beginning of the past academic year the trustees of Cornell University began to receive students desiring to fit themselves to enter this new and constantly extending field. While the general studies of the new course are mainly those of the departments of Civil and Mechanical Engineering, the special studies of the course embrace the theory of electricity, the construction and testing of telegraph lines, cables, and instruments, and of dynamo-machines, and the methods of electrical measurements, electrical lighting, and the electrical transmission of power.

EQUIPMENT.

The University possesses a very extensive collection of electrical apparatus, including resistance coils, galvanometers, condensers, and other apparatus for measurements, from Elliott Brothers of London, Siemens & Halske of Berlin, and other makers; the special instruments by Deprez, Siemens & Halske, Professors Ayrton and Perry, and Sir William Thompson, for measuring the currents and potentials of dynamo-machines; two large and several small dynamo-machines; electric lamps of several makers; telegraph and telephone instruments; besides

magnetometers, dynamometers for measuring power used in driving dynamos, photometers, and other accessory apparatus. Telegraph and telephone lines are available for making tests, and electric light circuits upon the University grounds enable the student to make his experiments under the conditions that obtain in actual practice.

In the new Physical Laboratory every facility is provided for the use of electrical apparatus under the most favorable conditions, and a workshop attached to the laboratory provides for the construction of special instruments for investigations.

For the Course in Electrical Engineering see page 57.

MARINE ENGINEERING.

At the request of the University, an officer of the engineer corps of the United States Navy has been detailed for the purpose of giving instruction in Marine Engineering. Special work in this subject, under the general direction of the department of mechanic arts, may therefore be taken by such students as desire it.

MINING ENGINEERING.

Although no department of Mining Engineering has yet been formally established, all the main instruction required by a mining engineer is now given, as follows: the professor of civil engineering and his associates pay special attention to the needs of those intending to connect themselves with the mining industries, giving lectures on tunneling and on the theory and practice of such constructions as are common to the professions of civil and mining engineer; the professor of mechanical engineering and his associates pursue a like course, giving instruction in mining machinery; the professors of general chemistry and mineralogy, and of analytical chemistry, give instruction in metallurgy, assaying, chemical analysis, and cognate subjects; the professors of geology and palæontology give instruction in the theory and classification of ores, and in those branches relating to chemical geology.

HISTORY AND POLITICAL SCIENCE.

I. HISTORY.

The aim in the courses of instruction in History is to present, in logical and chronological sequence:

1. *General History, Ancient, Mediæval, and Modern*, with especial reference to the political and social development of the leading nations.

2. *The Constitutional History of England*, as that which has most strongly influenced our own.

3. *The Comparative Constitutional and Legislative History of various modern states*, as eliciting facts and principles of use in solving American problems.

4. *The History, Political, Social, and Constitutional, of the United States*, with a systematic effort to stimulate the student to original research into the sources of our national history.

5. *The Philosophy of History*, as shown by grouping the facts and thoughts elicited in these various courses.

1. General History.

The instruction in General History extends through the four years, as follows:

1. General Ancient, Grecian, and Roman History, beginning with the spring term of the freshman year and continuing through the three terms of the sophomore year.

2. Mediæval History: General History of the social and political development of Europe during the Middle Ages, mainly by instruction in general English history during the sophomore year, and by special lectures in the junior year.

3. Modern History: (*a*) 1883-4, The history of Germany: fall term, the period of the Reformation; winter term, from the Reformation to the French Revolution; spring term, the nineteenth century. (*b*) 1884-5, The history of France: fall term, from the close of the Middle Ages to the French Revolution; winter term, the French Revolution; spring term, the Napoleonic and recent periods.

In connection with the above there are lectures on important points and periods in the history of other modern nations.

Instructors: President White, Professor C. K. Adams, Assistant Professor Perkins, and Mr. Burr.

2. English History.

The instruction in general English History is given by recitations from text-books during the entire sophomore year. This is followed by courses of lectures to the upper classes on the growth and principles of the constitution, the aim being to present the great bases of law and policy on which the structure of the English government rests. The early Saxon institutions are described at some length; and the lectures follow the development of the system from this germ through its leading phases down to modern times. Special attention is paid, during the whole course, to such topics as illustrate the institutions and constitutional history of the United States.

Instructors: Professors Goldwin Smith and Tuttle, and Assistant Professor Perkins.

3. Comparative Constitutional and Legislative History.

This subject is treated, as far as possible, in the courses of lectures upon Modern History in the junior year, and in a special course of lectures during the senior year.

Instructors: President White and Professor C. K. Adams.

4. American History.

The study of American History extends through the junior and senior years, and for each of those years is a continuous subject. The topics to which particular attention is paid are the following: The native races, especially the Mound-builders and the North-American Indians; the alleged Pre-Columbian discoveries; the origin and enforcement of England's claim to North America, as against competing European nations; the motives and methods of English colony-planting in America in the seventeenth and eighteenth centuries; the development of ideas and institutions in the American colonies, with particular reference to religion, education, industry, and civil freedom; the grounds of inter-colonial isolation and of inter-colonial fellowship; the causes and progress of the movement for colonial independence; the history of the formation of the national constitution; the origin and growth of political parties under the constitution; the history of slavery as a factor in American politics, culminating in the civil war of 1861 65.

In the presentation of these topics, the student is constantly directed to the original sources of information concerning them.

and to the true methods of historical inquiry. The effort is also made to use American literature as a means of illustrating the several periods of American History.

Instructor: Professor Tyler.

5. Philosophy of History.

The lectures on this subject are given in the winter term of the senior year. Their object is to trace the origin and progress of civilization, and to point out the causes and institutions, civil, social, and religious, which have tended to advance, or to retard its progress. The first half of the course treats of general principles, and the last, of the historic progress of civilization, beginning with the settlement of the Aryan nations in Europe.

Instructor: Professor Wilson.

II. POLITICAL AND SOCIAL SCIENCE.

The division includes the following topics:

1. *Political Economy and Finance.*
2. *Systematic Politics.*
3. *International Law.*
4. *American Law and Jurisprudence.*

1. Political Economy.

The instruction in Political Economy is given by recitations from text-books in the elements of the science during the winter and spring terms of the junior year; and by a course of lectures during the spring term of the senior year, in which practical questions arising in the study of industrial society receive attention. A course of lectures upon the science of finance, embracing a study of the comparative financial administration of constitutional nations and the various sources of public revenue, is given during the senior year. During the present year there will also be given a special course of lectures upon the American revenue system, and another upon the currency and banking of the United States. All these courses of lectures are to be supplemented by private reading.

Instructors: Professor Wilson, Associate Professor H. C. Adams, and Lecturers Roberts and Knox.

2. Systematic Politics.

The aim of the instruction in this course is to present both the philosophical and the practical side of the subject in a logical

order of treatment. It comprises the two general topics of theoretical and practical politics.

Theoretical politics treats of primitive societies, the growth of states, forms of government, history of political literature and speculation, and the philosophy of the state. Practical politics treats of states in their concrete relations, and includes such subjects as constitutional organization, legislation, administration and civil service methods, justice, revenue, military systems, and a comparative survey of existing governments. The historical and the analytical methods are both used, and the object of the course is to make the student acquainted in a scientific sense with the true principles of political organization and practice, as well as with the existing institutions of the great civilized states.

Instructor: Professor Tuttle.

3. International Law and Diplomacy.

The instruction in this department consists of a course of lectures given during the winter term of the senior year. The course treats, among other subjects, of the history and literature of the law of nations, rules of war, neutrality, prize, embassy, forms of diplomacy, history of American diplomacy, together with descriptions of some of the more famous international disputes in which the United States have been concerned.

Instructor: Professor Tuttle.

4. American Law and Jurisprudence.

The course consists of about forty lectures. The first three are devoted to the more general relations of man to government; then follow twelve lectures on the constitution of the United States, and five on the origin and development of international law; then lectures on the rights of persons and of property, with a general discussion of the nature of contracts, partnerships, and corporations; then lectures on crime and criminal law, and the course concludes with four lectures on the legal maxims relating to sovereignty, legislation, customary law, and the judiciary.

Instructor: Professor Wilson.

For the Course in History and Political Science see page 61.

LANGUAGES.

I. THE ANCIENT CLASSICAL LANGUAGES.

An outline of the course of reading in the Classics is given below. Greek belongs to the course in Arts, and Latin to the courses in Arts, Literature, Philosophy, and History and Political Science. The distribution in regard to the number of years of required and optional study may be seen by consulting the tabulated statements of those courses. The number of weekly exercises with all undergraduate classes in Greek is three, and in Latin four, with the exceptions noted below. Instruction in Greek and Latin composition accompanies the study of the authors; lectures are occasionally substituted for recitations; and the examinations regularly comprise the translation of passages not previously seen by the student.

Greek.

FRESHMAN YEAR.

Fall Term.—Plato's Apology of Socrates; Grecian antiquities.

Winter and Spring Terms.—Homer and Herodotus; the history of Greek literature.

SOPHOMORE YEAR.

Fall Term.—Thucydides.

Winter and Spring Term.—Euripides, Æschylus, Aristophanes (one play of each).

JUNIOR YEAR.

Fall Term.—Plato continued.

Winter and Spring Terms.—Sophocles.

SENIOR YEAR.

Fall Term.—Selections from the Attic orators.

Winter and Spring Terms.—Dramatic poets, continued; selections from the Lyric and Bucolic poets.

For graduate work in Greek see below.

Latin.

FRESHMAN YEAR.

Fall Term.—Livy.

Winter Term.—Cicero's De Amicitia; the Odes of Horace (Book I).

Spring Term.—The Odes (Books II–IV) and Epodes of Horace

SOPHOMORE YEAR.

FALL TERM.—The Agricola, Germania, and Dialogus of Tacitus; Roman antiquities.

WINTER TERM.—Terence; the Satires of Horace (Book I); the history of Roman literature (text-book and lectures).

SPRING TERM.—The Satires (Book II) and Epistles of Horace; the history of Roman literature.

JUNIOR YEAR.

FALL TERM.—The Annals or the Histories of Tacitus; *three-hour optional course.* The Georgics of Virgil: *one-hour optional course of lectures.*

WINTER TERM.—Juvenal: *three-hour optional course.* Cicero's Letters: *one-hour optional course of translation at sight, with lectures.*

SPRING TERM.—Catullus, Tibullus, Propertius: *three-hour optional course.* Persius: *one-hour optional course of lectures.*

SENIOR YEAR.

FALL TERM.—Plautus; Quintilian: *three-hour optional course.* The comparative philology of Greek and Latin: *one-hour optional course of lectures.*

WINTER TERM.—Lucretius: *three-hour optional course.* The comparative philology of Greek and Latin: *one-hour optional course of lectures, in continuation of the work of the fall term.*

SPRING TERM.—The Letters of Pliny the Younger: *three-hour optional course.* Early Latin inscriptions and literature: *one-hour optional course of lectures, in continuation of the work of the fall and winter terms.*

A graduate class, working under the direction of the professors of Greek and Latin, meets weekly. The work of the present year is as follows:

In Greek, Homeric philology, subdivided thus: etymology and definition of words peculiar to Homer and the epic dialect; etymology of Homeric word-forms; metrical peculiarities; syntactical constructions peculiar to Homer; Homeric antiquities including mythology; textual criticism and bibliography.

In Latin, Latin accent, and the critical reading of Plautus, with special reference to the following: metre and prosody grammar; etomology of words and forms peculiar to Plautus textual criticism; the history of early Latin comedy.

II. GERMANIC LANGUAGES.

The first two years in German are specially intended, besides preparing the student for progressive and independent work in the language, to give those who have not a classical training some grammatical discipline, and an insight into the growth and relations of Indo-Germanic speech. Instruction is also given to optional classes in the more advanced study of the Germanic languages.

German.

During the whole of the freshman year Whitney's Grammar and Reader are used, accompanied by Ahn's (Fischer's) exercises in writing German. In the fall term a knowledge of the inflections is gained, the strong verbs are begun, and stories and ballads are translated, with daily exercises in writing. In the winter term the strong verbs are completed, the syntax of nouns, the uses of the moods, and the arrangement of sentences are studied, with advanced translation and the writing of German. In the spring term, with advanced translation and writing, exercises in translation at sight are also given, and the relation of English to German is traced by the application of Grimm's law, in connection with the special study of etymology.

In the fall term of the sophomore year one of Schiller's or Goethe's dramas is studied, followed in the winter term by extracts from Goethe's or Schiller's prose. In the winter term a course in scientific German is also offered, as an alternative. In the spring term Goethe's Hermann und Dorothea, Lessing's Minna von Barnhelm, or some similar work, is read. The work of the fall term is chiefly philological, while in the winter and spring terms more attention is paid to literary biography and reading at sight.

During the junior and senior years occur lectures and recitations, with optional classes, on German history, literature, and mythology, and courses are given varying from year to year, embracing the works of the leading authors. Classes are also formed in composition and conversation, and recent dramatic literature and the works of living novelists are read.

Other Germanic Languages.

Special instruction is offered in Gothic, Old and Middle High German, and the Scandinavian and Netherland languages.

In Gothic, the text-books are Heyne's and Bernhardt's editions of Ulfilas and Braune's Grammar; in Old German, Braune's Althochdeutsches Lesebuch, with lectures on the early German alliterative poetry and the later forms of German verse. In Middle High German the epic, lyric, and didactic poetry is studied, with the addition of prose selections. The Netherland languages are pursued with special reference to the explanation of English forms and idioms, and works in modern Dutch and Flemish are read.

The Scandinavian languages are taught chiefly by means of German text-books. In Icelandic, use is made of Wimmer's Altnordische Grammatik, and Vigfusson and Powell's Icelandic Prose Reader, and lectures are given on Scandinavian history and literature.

III. ROMANCE LANGUAGES.

French.

Joynes-Otto's Elementary French Course is studied during the fall term of the freshman year. Translation is begun in the same term and continued in connection with grammatical exercises throughout the year. The amount read is the equivalent of two of Bôcher's Modern French plays and Lacombe's Petite Histoire du Peuple Français. In the sophomore year two courses are offered, one in general literature, embracing both the modern and classical periods; and one in modern French, with special reference to its use in practical and scientific studies. In the first course are read such works as Mérimée's Colomba, Molière's Les Femmes Savantes, and Voltaire's Siècle de Louis XIV; one hour a week in the winter term is devoted to composition, and one in the spring term to conversation. In the second course are read such works as Garigue's Simples Lectures sur les Sciences, les Arts et l'Industrie, and the periodical, La Nature.

Optional courses are given during the junior and senior years in Old French and in recent literature and literary history.

Italian.

During the first year Ricci's Italian Principia is used with Lardelli's Letture Scelte and Manzoni's I Promessi Sposi. In the second year selections are read from Dante's Inferno, and from Boccaccio and Petrarch.

Spanish.

Knapp's Grammar of the Modern Spanish Language is used during the fall term; and Knapp's Modern Spanish Readings in the winter and spring terms.

IV. ORIENTAL LANGUAGES.

None of the languages here included are required for any baccalaureate degree conferred by the University. The Professor of Sanskrit and Living Asiatic Languages gives, in addition to special instruction, lectures bearing upon ethnographical philology and general linguistic science.

MATHEMATICS AND ASTRONOMY.

The instruction offered by this department is designed to meet the wants of all classes of students. Undergraduates in all the regular courses except Natural History have the Mathematics of the first year, namely, geometry, algebra, and trigonometry; those in Mechanic Arts, Architecture, and Civil Engineering have two or four terms of analytical geometry and calculus; those in most of the general scientific courses have analytical geometry and astronomy; and all students have the privilege of electing these and the higher branches. The full course given below is designed for those intending to teach Mathematics, or to use it as an instrument of investigation.

According to the subject taught, there are one, two, three, or five exercises a week, consisting of lectures and recitations, with the solution of problems or with other written exercises; and much of the later work is from French or German text-books.

In all the classes frequent reviews and examinations are held during the term, besides the regular examination at its close. These preliminary examinations cover previous as well as current work, and test the student's command of general principles and methods as well as of details. They are given without notice.

To graduates and special students, instruction is offered in the theory of numbers, quantics, and celestial mechanics.

For the Course in Mathematics see page 58.

MECHANIC ARTS.

In 1870 the Hon. Hiram Sibley, of Rochester, N. Y., provided for the erection of a suitable building for the department of Mechanic Arts. He also gave ten thousand dollars for increasing its

equipment of tools, machines, etc., and has since made a further gift of thirty thousand dollars for the endowment of the professorship of Practical Mechanics and Machine Construction. Still later he provided the means for erecting and fitting up a brass and iron foundry, and a blacksmith shop.

Closely connected with the lecture-rooms are the rooms for freehand and mechanical drawing, for the designing of machinery and pattern-making, and the machine shop. The shop practice embraces work requiring the use of all hand-tools and the machines employed in the ordinary machine shops.

Each student in the department is required to devote two hours a day to work in the shop; but such students as have, before entering, acquired sufficient practical knowledge, are admitted to advanced standing.

Mechanical Laboratory.

The machine shop is used for the sole purpose of giving instruction in practical work. It is supplied with lathes of various kinds, planers, grinding machines, drilling machines, shaping machines, a universal milling machine fitted for cutting plane, bevel, and spiral gears, spiral cutters, twist drills, with additional tools and attachments for graduating scales and circles, and for working various forms and shapes.

In addition to the hand and lathe tools of the usual kinds there are tools of the greatest accuracy, consisting of standard surface-plates, straight-edges, and squares of various sizes, a standard measuring machine, measuring from zero to twelve inches by the ten-thousandth of an inch, a universal grinding machine for producing true cylindrical and conical forms, and a set of Betts's standard gauges.

In the iron and brass foundry and the blacksmith shop, instruction is given in molding, casting, and forging. The cupola used is one of Colliau's improved, with a capacity for melting one ton of iron per hour.

For the purpose of instruction in experimental work there is a twenty-ton Riehle testing machine, arranged for testing the strength of materials by tension, compression, and transverse strain; Wood's apparatus for testing steam-gauges, pressure per square inch, etc.; Richards's, Thompson's, Crosby's, and Tabor's steam-engine indicators; Amsler's planimeter; Schaeffer & Budenberg's revolution counter, steam-gauges, injectors, inspirators,

and pop-valves; Blake's, Blakesley's, Deane's, Miller's, and Woodworth's steam-pumps; Allen's, Chase's, Gardner's, Lynde's, Shive's, Waters's, and Wright's governors; Baldwin's link and valve motion, and experimental valve motion; a complete collection of Reuleaux's kinematic models; together with a large collection of brass, iron, and wooden models, illustrative of mechanical principles.

The course of instruction in mechanical drawing is progressive, from geometrical drawing to the designing of machines and the making of complete working drawings.

The appliances for instruction consist of several hundred drawings selected from those of technical schools abroad, and from representative American steam-engine makers and others; of photographs, models, and machines; and of apparatus used in copying by the "blue-print process."

For the Course in Mechanic Arts see page 62.

MILITARY SCIENCE.

Pursuant to the act of Congress creating the land grant on which the Cornell University is founded, and the act of the legislature of the State of New York assigning that land grant, instruction is provided in Tactics and Military Science. Drill and Military Science are "a part of the studies and exercises in all courses of study and in the requirements of all students in the University" during the fall and spring terms of the freshman and sophomore years and the winter term of the senior year. Foreigners, laboring students, and those physically unfitted therefor are excused from drill. Students are required to provide themselves with the University uniform, unless excused on account of inability to procure it, and they are held accountable for loss or injury to the arms and other public property issued to them.

The course extends through the fall and spring terms of the first two years, and the winter term of the senior year. During the first two years there are three exercises a week, of an hour each; those of the senior year consist of a regular course of lectures on the general operations and science of war, twice a week.

The subjects treated are: *The Art of War.*—To comprise the history and principles of grand and minor tactics; the organiza

tion of armies, with some account of the administrative arrangements of our own army; strategy, with historical illustrations; and accessory operations of war. *Military Engineering.*—To comprise the principles of military topography; the effect of projectiles; the principles of fortification, with their application to field works; military mining; the attack and defense of works; and the construction of military roads and bridges. *Military Law.*—To comprise the origin, principles, and limitations of military law; the nature and force of the articles of war and the general regulations for the army; a summary of the rules of evidence; the constitution, jurisdiction, and procedure of courts-martial, courts of inquiry, military commissions, and military boards.

Any student who has satisfactorily performed all the duties required for the first two years, and who is qualified therefor, may be selected for the place of a commissioned officer if needed. For the performance of his duties as a commissioned officer in the junior or senior year he is entitled to a credit of three recitations a week for each term; and, at graduation, he may receive a certificate of military proficiency with his diploma.

The practical military exercises include: *Infantry Tactics.*—To comprise the schools of the soldier, company, and battalion; with skirmishing, the forms of parade, and the duties of guards. *Artillery Practice.*—To comprise at least the school of the piece and section for the field guns, with such further artillery instruction as may be found practicable. *Special Exercises.*.—To comprise recitations at such times as may be prescribed

NATURAL HISTORY.

I. BOTANY.

A course of instruction is given on the following subjects: physiological botany, field work, compositæ and gramineæ, systematic and economic botany, vegetable histology, fungi and algæ, vegetable physiology, the higher cryptogams, principles of plant culture, arboriculture and forestry, and woody plants. The instruction in most of these courses includes both lectures and laboratory work, the latter being supplemented, whenever desirable, by field work or class excursions. The arrangement of the several subjects in regard to the terms and years which they

are given, may be ascertained by reference to the tabulated statement of the courses in Natural History and in Agriculture.

The full course in Botany as laid down is not intended to be wholly inflexible, and students whose standing will warrant it may shape their studies by their taste, or by the ultimate object they have in view. To those who have completed a large share of the regular course, opportunities are afforded for advanced work in some special branch of botanical science.

Herbarium and Apparatus.

The means of illustrating the instruction in Botany include the Herbarium, estimated to contain fifteen thousand species; two series of models, the Auzoux and the Brendel; two sets of maps, one by Achille Comte, the other by Professor Henslow; a lime lantern with five hundred views, illustrating different departments of Botany, but especially phytography; ten compound microscopes and several dissecting microscopes; a collection of fruits, barks, cones, nuts, seeds, fibers, and various dry and alcoholic specimens; a general collection of economic vegetable products, and above a thousand specimens of the woods of different countries. Besides these, the large conservatories and gardens, and an uncommonly rich native flora afford abundant material for illustration and practical work.

II. GEOLOGY AND LITHOLOGY.

Instruction is given in general and economic geology and lithology by means of lectures, laboratory practice, and field work. The lectures consist of a course on general geology in the fall term, and a course on economic geology in the winter term.

The laboratory work consists of a progressive series of exercises in determinative lithology, for which at least one term of previous work in the mineralogical laboratory is required; and of exercises in the preparation of geological sections and maps from the data furnished by government reports, and careful study of the chief characteristic fossils of the various geological periods. During the fall and spring terms there are frequent excursions and lessons in field work.

To advanced students, opportunities are offered for the microscopic investigation of minerals and rocks, and for the extended study of important mineral districts, with the preparation of reports thereon and discussions of the metallurgical methods and

appliances adapted to their products. The rocks of Ithaca and its neighborhood afford ample material for study and original research.

III. PALÆONTOLOGY.

Instruction is given as follows: by laboratory work throughout the year; by excursions during the fall and spring terms to the rich fossiliferous localities in and about Ithaca; and by lectures on systematic palæontology in the winter term.

The elementary work comprises the observation and recording of facts, the collecting of material in the field, the critical study of the literature, and the classification in the laboratory of invertebrate fossils from all parts of the world.

Exceptional facilities are offered for advanced work in the interpretation of fossil forms as marks of geological age and sequence; in the study of faunas, their conditions and distribution; and in the critical study of species and genera, their characters, relations, and modifications, as exhibited in the faunas and floras of the past.

Laboratory.

The laboratory is well furnished with the appliances needful for successful study. Among other things, it has numerous maps, wall tablets, engravings of geological objects, and magic-lantern slides. Large and important additions have also been made during the past year to the lithological and stratigraphical collections.

Museum of Palæontology.

The museum comprises the following collections:

1. The Jewett Collection, accumulated by the late Col. Jewett when curator of the State Cabinet of Natural History. This collection is especially rich in New York fossils, containing many of the original specimens described in the State reports, and not a few unique specimens.

2. A fair representation of the rich faunas of the cretaceous and tertiary formations along the eastern and southern part of the Union, and a large number of characteristic English and European fossils.

3. A fine series of English mesozoic fossils; of tertiary fossils from Santo Domingo; of pre-glacial fossils from Sweden; and

numerous smaller collections from various typical localities in our own country.

4. The Ward series of casts.

5. The unique collections from Brazil, made by Prof. Hartt and party on the Morgan expedition, containing the original specimens; and a great number of duplicates.

Numerous additions have been made during the past year, making the museum more complete in ichthyosauri and other vertebrate remains, in Trenton trilobites, and in the fauna of the Upper Devonian.

IV. VERTEBRATE ZOOLOGY.

The title likewise includes Human Physiology and Hygiene, Microscopy, and Comparative Anatomy. The instruction is by lectures, demonstrations, laboratory practice, and field work, as follows:

1. *Hygiene.*—Early in the fall term are given six lectures upon the personal care of health, and upon emergencies. Among other practical matters, students are shown how to check bleeding, and how to practice the best methods for resuscitating the drowned.

2. *Human Physiology.*—The thirty-six lectures treat chiefly of the subjects not included in the entrance examination, the phenomena of nervous and muscular action, the vaso-motor system, and the structure and functions of the brain. They are illustrated by a life-sized manikin and other models, by numerous anatomical preparations, by diagrams, and by painless experiments upon the frog and cat. Each student also examines, through the microscope, about thirty preparations of the tissues, including the living amœba, cilia in action, and the circulation in the frog's foot and necturus's gill.

3. *General Vertebrate Zoölogy.*—At one-third of the thirty-six lectures the student examines representative forms, including amphioxus, lamprey, shark, perch, catfish, necturus, frog, turtle, fowl and cat. The lectures are illustrated by a full set of Auzoux models, by diagrams, and by the free use of the zoölogical collections.

4. *Comparative Anatomy.*—A course of twenty lectures is devoted either to the brain or to some special group of vertebrates. In either case, practical work is done both in dissecting and in the examination of the literature of the subject.

5. *Anatomical, Microscopical, and Physiological Technology.*—The forty lectures upon these subjects are accompanied by practical demonstrations of all the methods presented, and these methods are employed by the student in the laboratory.

LABORATORY PRACTICE.—This varies with the needs of the student and the extent of his preparation. Usually, as a basis for other work, the skeletons of man and the domestic cat are studied, and some of the bones are drawn and described by the student. He then dissects some of the muscles, vessels, and nerves. In the winter term, the methods of microscopical manipulations are learned, and the tissues of the cat, frog, and necturus are examined. In the spring term the student examines the brain, heart, and other viscera of the cat, and performs for himself the simpler physiological experiments. Ordinarily, laboratory work can be commenced only at the beginning of the year, and the student must have had instruction in drawing.

After the first year the student, according to his purposes, dissects other vertebrate animals, or human subjects. There are special facilities for the study of the brain, heart, and early stages of development.

FIELD WORK.—During the fall and spring terms the students are occasionally accompanied by their instructors to the field or lake in order to observe living animals, and to learn the methods of their capture and preservation.

MUSEUM.—The vertebrate collections are as follows: About twenty-three hundred examples of about twenty-two hundred species of entire animals in alcohol. Nearly half of the specimens are fishes collected in Brazil by the late Prof. C. F. Hartt; the remainder include series of named fishes from the Smithsonian Institution and the Museum of Comparative Zoölogy, representatives of the general North American fauna, and of the local fauna, and rare forms from various parts of the world. Among the last are the following: Chimpanzee, orang, dingo, pangolin, sloth, ant-eater, armadillo, ornithorhynchus, echidna, jacana, sphenodon, monitor, heloderma, crocodile, alligator, draco, axolotl, proteus, megalobatrachus, siren, amphiuma, pipa, ceratodus, protopterus, polypterus, calamoichthys, thalassophryne, chimæra, myxine, bdellostoma, and amphioxus.

About twenty-five hundred anatomical preparations, including mounted skeletons of man, gorilla, lion, camel, sloth, ostrich, alliga-

tor, frog, cryptobranchus, necturus, cæcilia, and amia; more than six hundred preparations of the brain; large series of dissections of the lamprey and necturus; embryos or young of man, ape, leopard, opossum, kangaroo, manatee, dugong, peccary, lama, sea-lion, bat, alligator, necturus, amia, lepidosteus, shark, skate, and domesticated animals.

About four hundred microscopical preparations, chiefly from the cat, frog, and necturus.

More than one thousand mounted skins of birds, many of which were presented by the late Green Smith, Esq., including ostrich, emeu, apteryx, penguin, etc.

Many mounted skins of other vertebrates, including orang, tiger, moose, camel, beaver, hyrax, centetes, galeopithecus, porpoise, koala, wombat, kangaroo, echidna, ornithorhynchus, gavial, heloderma, megalobatrachus, etc.

V. ENTOMOLOGY AND GENERAL INVERTEBRATE ZOOLOGY.

Owing to the economic importance of the study of insects, and to the difficulties attending a thorough study at a distance from the sea-shore of any group of marine animals, more attention is given to entomology than to any other division of invertebrate zoölogy.

General Zoölogy of Invertebrates.

There are three exercises per week during the winter term. Two of these are lectures; and the third consists of an examination by the students of specimens illustrating the subjects discussed in the lectures. At these practical exercises the minute forms of animal life are examined microscopically; and each student dissects specimens of the larger typical invertebrates, including squid, clam, ascidian, gephyrea, starfish, sea-urchin, crayfish, and grasshopper.

Those students who wish to pursue the subject farther, after taking the above course, are admitted to the laboratory. Here the greater part of the work indicated in Brooks's Handbook of Invertebrate Zoölogy is performed as a basis for more advanced study. From this point the work varies with the needs of the student. The laboratory is open during the entire year.

Entomology.

In addition to the course on economic entomology described on page 61, there are special facilities for advanced work in systematic entomology, insect anatomy, and the study of the life-histories of insects. The entomological laboratory is open during the entire year.

Collections of Invertebrates.—1. The general collection of invertebrates comprises a small but well selected series of forms representing all of the larger groups. In this collection there is a nearly complete set of the duplicates distributed by the U. S. National Museum, many specimens collected on the coast of Brazil by the late Professor C. F. Hartt, and specimens from Florida and the West Indies, collected by Dr. Wesley Newcomb.

2. The Newcomb collection of shells embraces more than eighty thousand examples of more than twenty thousand varieties, representing at least fifteen thousand species.

3. There is in the collection a set of the Auzoux models, and of the glass models made by Blaschka.

4. The biological and systematic collections of insects are described elsewhere under the general head Agriculture.

For the Course in Natural History see page 59.

VI. PRELIMINARY MEDICAL EDUCATION.

There is no medical department in the University, but special facilities are afforded those who wish their course to be of direct use in the study of medicine.

The Faculty believe that the crowded and difficult curricula of the medical schools should be preceded, when possible, both by a broad general education, and by a special and practical training in certain branches. They therefore strongly advise those who intend to become physicians to pursue some one of the full courses, and then to become resident graduates, reviewing physiology and chemistry, attending the lectures in veterinary science, and taking laboratory work in chemistry and anatomy.

When only four years are available, the courses in Natural History, Science, and Science and Letters afford more or less time for laboratory work, especially in the senior year.

In case the student can remain but two years, he is advised to take the two-year Course Preparatory to the Study of Medicine, which embraces the branches best calculated to serve as the basis of a proper medical education.

Finally, special students are received for a shorter period than two years, if fitted to undertake the lectures and laboratory work.

For the Course Preparatory to the Study of Medicine see page 60.

PHILOSOPHY AND LETTERS.

LITERATURE.

English Literature, and Rhetoric and General Literature, form a part of each of the general courses of study, either as required or as optional work, the matter being distributed as shown in the tabulated statements of those courses.

1. *ANGLO-SAXON AND ENGLISH LITERATURE.*

SPECIAL COURSE.

SOPHOMORE YEAR.

FALL and WINTER TERMS.—Anglo-Saxon grammar, the A.-S. Version of the Gospel according to St. John, and selections from the Homilies of Ælfric.

SPRING TERM.—Selections from King Alfred's A.-S. Version of the History of Paulus Orosius, and of Boethius De Consolatione Philosophiæ, and selections from the A.-S. Chronicle.

JUNIOR YEAR.

FALL TERM.—Selections from Layamon's Brut or Chronicle of Britain, the Ancren Riwle, and the Ormulum; the Proclamation of King Henry III, and selections from Robert of Gloucester's Chronicle.

WINTER TERM.—Selections from Dan Michel's Ayenbite of Inwyt, or Remorse of Conscience, the Voiage and Travaile of Sir John Maundeville, Trevisa's Translation of Ralph Higden's Polychronicon, the Vision of William concerning Piers Plowman, Pierce the Plowmans Crede, and the Wycliffite Versions of the Bible.

SPRING TERM.—Chaucer's Prologue to the Canterbury Tales, the Knightes Tale, the Nonne Prestes Tale, etc., and lectures on the language and versification of Chaucer.

SENIOR YEAR.

FALL and WINTER TERMS.—The critical textual study of selected poems and plays.

SPRING TERM.—Lectures on Shakespeare and contemporary dramatists.

GENERAL COURSE.

JUNIOR YEAR.

FALL TERM.—Lectures on the English language and literature, from Chaucer to Shakespeare, inclusive.

WINTER TERM.—Lectures on the English language and literature, from Milton to Cowper, inclusive.

SPRING TERM.—Lectures on English literature of the nineteenth century.

A syllabus of the course, prepared by the professor, presents to the student the leading points of each lecture, and the order of their treatment, designates the best editions of an author's works, or parts of them, that are generally accessible, and guides the student to such sources, philological, historical, biographical, critical, etc., as enable him to read to the best advantage.

Three lectures a week are given throughout the year.

It is sometimes found advisable to depart from the chronological order, and to begin with the lectures of the winter term, as given above, or of the spring term.

II. RHETORIC, GENERAL LITERATURE, AND ORATORY.

The course in rhetoric, general literature, and oratory extends through the four years.

The work of the freshman year embraces the principles of elementary rhetoric, including diction, the properties of the sentence, the structure of paragraphs, figures of speech, and the history and elements of the English language. In addition to recitations on these topics, each student every week writes an exercise, which is corrected and returned to be rewritten.

The sophomore year takes up the study of narration and description, and includes the writing of essays, which, after correction, are returned to the student to be rewritten. Elocution and exercises in declamation are optional during the winter and spring terms.

The junior year includes exposition and advanced rhetoric. Original themes and orations are delivered before the class, after private criticism by the professor. During the spring term, lectures are given on oratory and orators, the themes and orations being on related topics.

The senior year continues the delivery of themes and orations and takes up the study of general literature, which is taught entirely by lectures and collateral reading. The lectures are on topics connected with the history of literature, its different periods, and the leading representative essayists and orators. Optional classes are formed for the special study of Shakespeare, Demosthenes, and the masters of English prose style, and for practice in oral discussion and extempore speaking.

MORAL AND INTELLECTUAL PHILOSOPHY.

Instruction in Philosophy begins in the fall term of the junior year. During that term it comprises a study of the physiology of the nervous system in relation to mental phenomena, and the nature and origin of knowledge; and during the winter term, the study of moral philosophy, theories of morals, and the development of moral sentiments. In the spring term the subject is logic, including the laws of thought, the formulæ of reasoning, and the various methods of proof and refutation, together with the methods of investigation and the grounds of certainty.

The subject during the fall term of the senior year is the history of philosophy, and the progress of knowledge from its beginning in Greece to the present day, with criticisms on the methods of philosophy and transcendental logic.

THE UNIVERSITY LIBRARY.

The Library contains about forty-nine thousand five hundred volumes, besides fifteen thousand pamphlets. It is made up chiefly of the following collections, increased by annual additions of from three thousand to five thousand volumes: a selection of about five thousand volumes purchased in Europe in 1868, embracing works illustrative of agriculture, the mechanic arts, chemistry, engineering, the natural sciences, physiology, and veterinary surgery; The Anthon Library, of nearly seven thousand volumes, consisting of the collection made by the late Professor Charles Anthon, of Columbia College, in the ancient classical languages and literatures, besides works in history and general literature; The Bopp Library, of about twenty-five hundred volumes, being the collection of the late Professor Franz Bopp, of the University of Berlin, relating to the oriental languages and literatures, and comparative philology; The Goldwin Smith Library, of thirty-five hundred volumes, presented to the University in 1869 by Professor Goldwin Smith, comprising chiefly historical works, and editions of the English and ancient classics—increased during later years by the continued liberality of the donor; the publications of the Patent Office of Great Britain, about three thousand volumes, of great importance to the student in technology and to scientific investigators; The White Architectural Library, a collection of over a thousand volumes relating to architecture and kindred branches of science, given by President White; The Kelly Mathematical Library, comprising eighteen hundred volumes and seven hundred tracts, presented by the late Hon. William Kelly, of Rhinebeck; The Cornell Agricultural Library, bought by the Hon. Ezra Cornell, chiefly in 1868; The Sparks Library, being the library of the late Jared Sparks, president of Harvard University, consisting

of upwards of five thousand volumes and four thousand pamphlets, relating chiefly to the history of America; THE MAY COLLECTION, relating to the history of slavery and anti-slavery, the nucleus of which was formed by the gift of the library of the late Rev. Samuel J. May, of Syracuse.

The Library is a circulating one so far as the members of the Faculty are concerned, and a library of reference for students. Undergraduates have free access to a collection of cyclopædias, dictionaries, and works of reference in the various departments of study, but they apply to the librarian for other works desired. Graduate students are admitted to the alcoves. And, upon the recommendation of the professor in any department, students of the senior and junior classes, engaged in special work in that department, will be granted access to the shelves for purposes of consultation.

The Library is managed by a body known as the LIBRARY COUNCIL, which consists of seven members, as follows: The President of the University and the acting Librarian, *ex officio*, one trustee chosen by the Board, and four professors nominated by the Faculty and confirmed by the Board. The President of the University is *ex officio* chairman of the council. The elected members hold office one year.

By the will of Mrs. Jenny McGraw Fiske, who died in October 1881, the Library received a specific bequest and was also made residuary legatee. From this source there has been paid to the University up to the present time about $700,000; and the income from this fund, known as the McGraw Library Fund, when it becomes available will be applied to the support and increase of the Library.

THE LIBRARY, a bulletin, is issued at intervals and contains classified lists of recent accessions, and of books in various departments, as well as other bibliographical matter intended to assist students in their use of the Library.

THE MUSEUM OF NATURAL HISTORY

The Museum of Natural History includes the collections in American archæology, botany, conchology, entomology, geology, ornithology, palæontology, veterinary science, and zoölogy. Except in botany, entomology, and veterinary science, the collections are deposited in the McGraw building. Some account of the several collections is to be found under the titles of the respective departments. Large additions have been made during the past year, and still larger ones are anticipated.

The Museum is managed by a body known as the Council of the Museum of Natural History, which consists of the President of the University, the members of the special faculty of Natural History, and the curator of the collection in American archæology, *ex officio*, and one trustee chosen by the Board, to hold office one year.

THE McGRAW-FISKE HOSPITAL.

In the year 1881, the sum of forty-five thousand dollars was bequeathed by Mrs. Jenny McGraw Fiske as a provision for the care of students who may fall ill during their attendance at the University. It is proposed that a portion of this sum shall be devoted to the erection of a cottage hospital, made comfortable and attractive, and thoroughly equipped in all respects; and that a trained nurse be attached to it, who shall be ready to give attention the moment it may be needed. The carrying out of the intention of the founder is at present delayed by legal proceedings.

PRIZES AND HONORS.

PRIZES.

No student is allowed to be a competitor for any of the following prizes who has not satisfactorily passed all his examinations for the terms preceding that in which he offers himself as a competitor. Nor will the prizes be awarded to any one who so far neglects his other studies as to fail to pass any of his required examinations at the close of the term in which the competition takes place.

The Woodford Prize.

A gold medal of the value of *One Hundred Dollars*, founded by the Honorable Stewart Lyndon Woodford, late Lieutenant-Governor of the State of New York, will be given annually for the best English Oration, taking into account both matter and manner.

The subjects for the Woodford prize the present year are as follows:

1. Abstract Theories in Politics.
2. The Demagogue as portrayed by Aristophanes.
3. The Growth of National Consciousness in the American People.
4. Efforts of the People in Different Ages to realize the Kingdom of God.
5. The Ethical Sentiment in Greek Tragedy.
6. The Ethics of our Political Idea.
7. Magic as a Presentiment of the Powers of Science.
8. "Every Day is Doomsday."
9. The Ideals of Roger Williams.
10. Fashion in Modes of Thinking.

11. The Propagandism of Philosophy as a Religion in the Age of the Antonines.

12. Magnanimity in Politics.

13. The Alleged Lawlessness of Genius.

14. The Explanation of History in Individual Experience.

15. The Social and Political Condition of Rome as Reconstructed from Cicero's Epistles.

THE HORACE K. WHITE PRIZES.

Established by Horace K. White, Esq., of Syracuse. To the most meritorious student in Veterinary Science, *Twenty Dollars*; to the second in merit, *Ten Dollars*.

HONORS.

I. HONORS AT GRADUATION FOR GENERAL EXCELLENCE.

Beginning with the year 1884, honors will be granted at graduation (subject to conditions stated below) to students whose general average in the studies required in their course is honorable.* These honors will be known as *honors for general excellence*, and will be recorded upon the commencement programme, and in the Register of the year following.

II. HONORS FOR DISTINGUISHED EXCELLENCE IN SPECIAL SUBJECTS.

Beginning with the year 1883, honors will be granted (subject to stated conditions) for distinguished excellence in any of the following subjects: history, political science, French, German, Greek, Latin, mathematics, chemistry, physics, entomology.

These honors will be conferred by the Faculty, upon the recommendation of the department concerned. They will be known as *special honors in* ——. They will be recorded in the Register of the year following, and *final honors* will also be announced upon the commencement programme of the year in which they are conferred.

Students who desire to be admitted as candidates for these honors must give notice in writing to the Registrar within four-

* In the usage of the University, the word "honorable" denotes the highest grade of standing; the word "creditable" denotes the next lower grade.

teen days after the day of registration of the spring term. The special examinations for honors will be held in May.

These special examinations will be of two kinds: in certain departments, there will be but a single examination, which will be open to seniors and graduates. In certain other departments there will be, in addition to this, another examination preliminary to the final one, to be known as the mid-course examination, and to be open to sophomores and juniors, and to seniors who intend to be candidates for final honors after graduation.

Graduates of other colleges studying in Cornell University may, by vote of the Faculty, be admitted to become candidates for these honors.

General Requirements.

In order to become a candidate for these honors, the student must satisfy the following requirements:

1. He must have completed all the required studies of his course up to the beginning of the term in which the special examinations are held.

2. At the beginning of the term in which the special examinations are held, his average for his entire work in the studies of his course, exclusive of those in the department in which he seeks for honors, must be creditable.

3. His average for his entire work in the department in which he seeks for honors, up to the beginning of the term in which the special examinations are held, must be honorable.

4. If the department be one in which a mid-course examination is given, the applicant for final honors must have won the mid-course honors.

The candidate must pass with distinguished excellence a special examination upon subjects to be announced in advance, and present any thesis or undergo any other test that may be required of him.

Honors in special subjects will not be granted to a student whose work is unsatisfactory in any of the studies of his course during the term in which the special examinations are held.

The special requirements will be as follows:

Mid-course Honors.

History; Political Science.—The candidate must have passed, with an honorable average, the required work in Grecian, Roman,

and English history, and must pass, with distinguished excellence, a special examination upon a subject to be announced in advance.

The subject for 1884 is either of the following, at the option of the candidate:

(*a*) In Modern European History: Reformers before the Reformation.

(*b*) In English History: The reign of Elizabeth.

French; German.—The candidate must have passed, with an honorable average, the required work of the freshman and sophomore years, and must also pass, with distinguished excellence, a special examination upon the following subjects:

(*a*) Translation at sight from French or German.

(*b*) Translation from English into French or German.

(*c*) Translation from specified French or German authors.

The subjects for 1884 are, in French: Molière, Le Misanthrope; Bossuet, Discours sur l'Histoire Universelle, Troisième Partie; Orations funèbres de Henriette Marie de France et de Henriette Anne d'Angleterre; Xavier de Maistre, Voyage autour de ma Chambre. In German: Lessing's Laokoon, xxv chapters (omitting notes), Clarendon Press edition; Schiller's Wallenstein's Tod; Goethe's Leiden des Jungen Werthers.

Greek; Latin.—The candidate must have passed, with an honorable average, the required work of the freshman and sophomore years, together with the courses in Grecian and Roman history; and must also pass, with distinguished excellence, a special examination upon the following subjects:

(*a*) Translation at sight from the easier Greek or Latin authors.

(*b*) Translation from English into Greek or Latin.

(*c*) Translation of passages from specified Greek or Latin authors.

The subjects for 1884 are, in Latin: Virgil's Aeneid, Books IX and X; Livy, Book XXII. In Greek; Homer's Odyssey, Books V and VI; Herodotus, Book I.

Mathematics.—The candidate must have passed, with an honorable average, the required work of the freshman and sophomore years of the course in mathematics, with the exception of the subjects of descriptive geometry and mathematical essays, and must also pass, with distinguished excellence, a special examination upon the following subjects:

(*a*) The solving of geometric problems.

(*b*) Modern geometry and conic sections.

(*c*) Algebra, including the theory of equations and the elements of determinants.

(*d*) Plane trigonometry.

University instruction, covering many of the topics required for this examination, is given to extra classes for two hours a week through the freshman and sophomore years, and candidates for mid-course honors are advised to join these classes.

Final Honors.

History; Political Science.—The candidate must be in full and regular standing in the Course in History and Political Science, with an honorable average in the special studies of that course, and must have won mid-course honors. He must also write a satisfactory thesis upon a subject specified in advance, and pass, with distinguished excellence, a special examination upon that subject.

The subject for 1884 is either of the following, at the option of the candidate:

(*a*) In American History: Von Holst's Constitutional History of the United States.

(*b*) In Modern European History: The political development of Germany in the nineteenth century.

For 1885:

(*a*) In American History: England's commercial restrictions upon the colonies prior to the Stamp Act.

(*b*) In Modern European History: The building up of the absolute monarchy in France.

(*c*) In English History: The Constitutional issues involved in the English Revolution of 1688.

(*d*) In Political Economy: The financial and economical reforms of Alexander Hamilton.

(*e*) In International Law: The Alabama Question in its historical and its legal aspects.

French; German.—The candidate must have won mid-course honors, and have passed, with an honorable average, an amount of optional work of the junior and senior years equivalent to three hours a week through two years; he must also present a satisfactory thesis, and must pass, with distinguished excellence, an examination upon the following subjects:

(*a*) Translation at sight from French or German.

(*b*) Translation from English into French or German.

(*c*) The political and literary history of some specified period.

(*d*) Certain specified works of that period.

The subjects for 1884 are, in French: the political and literary history of France from the Restoration in 1814 to the Revolution of 1848; and the following authors: Victor Hugo (selections from Hernani, Nôtre Dame de Paris, and poems), Gautier (Histoire du Romantisme), De Musset (selections), Lamartine (selections). The subject of the thesis required is a comparison of the French classic and romantic dramas, including a study of the origin and development of both.

The subjects for 1885 are, in French: the political and literary history of France under the Second Empire, 1852–1870; and the following authors: Emile Augier (selections from drama); Victor Cherbuliez (selections from novels); Octave Feuillet; and Edmond About (selections). The subject of the thesis required is a study of the literature of the above period with special reference to the influence of the Romantic School.

In German the subjects for 1884 and 1885 are: the political and literary history of Germany from Lessing to the death of Schiller; and the following authors: Lessing (selections from the Hamburgische Dramaturgie), Goethe (Wahrheit und Dichtung, Books 6–20), the correspondence between Schiller and Goethe. The subject of the thesis required is the *Sturm und Drang* period.

Greek; Latin.—The candidate must have won mid-course honors, must have passed, with an honorable average, in three hours a week of optional work for each of the junior and senior years, if the subject be Greek, in four hours, if it be Latin; and must also pass, with distinguished excellence, a special examination upon the following subjects:

(*a*) Translation at sight from the more difficult Greek or Latin authors.

(*b*) Translation from English into Greek or Latin.

(*c*) Translation from specified Greek or Latin authors (with commentary upon the questions of history, archæology, grammar, and etymology involved).

The subjects in Greek for 1884 are: Sophocles' Oedipus Tyrannus and Plato's Gorgias; in Latin, Plautus' Rudens, Terence's Andria, and Cicero's De Natura Deorum, Book 1.

For final honors, 1885, in Greek: Æschylus' Agamemnon; Demosthenes' De Corona. In Latin: Plautus' Trinummus; Terence's Andria; the first two Philippics of Cicero.

Mathematics.—The candidate must have won mid-course honors, and must have passed, with an honorable average, in the junior work in the integral calculus, differential equations, and finite differences, and in the senior work in analytical mechanics; must pass, with distinguished excellence, an examination in special junior work in analytical geometry and calculus equivalent to two hours a term, and in special senior work, equivalent to four hours a term; and must also present a satisfactory thesis.

Chemistry; Physics.—The candidate must, by the beginning of his senior year, have completed, with an honorable average, the required chemical and physical work of the first three years of the course in chemistry and physics, together with not less than half the whole number of hours of laboratory work in chemistry and physics laid down in the fourth year of the course; and in the senior year, besides the remaining hours of chemical and physical laboratory work, he must devote at least seven additional hours a week to advanced work in either the chemical or the physical laboratory, for the preparation of a thesis based upon original investigation; and must pass, with distinguished excellence, an examination upon the subject of his special work.

Entomology.—The candidate must have passed, with an honorable average, the regular examinations in the subjects of zoölogy (vertebrate and invertebrate), microscopic technology, botany (the elementary course, including field-work), and entomology (the general course, as laid down in the sophomore and junior years in the course in Agriculture); and must also pass, with distinguished excellence, a special examination upon the results of an investigation of one or more special subjects to which he has devoted an amount of work equivalent to two hours a term for two years.

The subject for 1884 is to be selected from the following list:

(*a*) The internal anatomy of the larva of the corydalus cornutus Linn.

(*b*) The insects injurious to woolen goods in the United States.

(*c*) The insects infesting apple trees at Ithaca.

(*d*) The insects injurious to wheat in the north-eastern part of the United States.

STATE SCHOLARSHIPS.

1. By the Laws of the State of New York, Chapter 585, § 9, and Chapter 684, §1, the School Commissioners and city Boards of Education of the State of New York are obliged to hold a competitive examination in each year, in each county or city in the State, for the purpose of selecting scholars for the Free Scholarships in Cornell University.

2. The law thus imposing a duty on the School Commissioners and city Boards of Education is understood to *confer a right* upon every student who is qualified to enter the examination and desires to obtain the scholarship, to have such an examination held, and it is believed that any such candidate for the scholarship can enforce his right, if need be, by an appeal to the proper State authorities.

3. Only one examination can be held during the year in any one county or city.

4. This examination *ought to be* held in the summer after the close of the public schools for the season, and before the beginning of the Fall Term of the University.

5. Of the time and place at which the competitive examination is to be held, due public notice should be given at a reasonable time before the examination is to be held.

6. At the examination it is not *necessary* that more than one of the Commissioners or of the School Board should be present, though it is highly desirable that a majority of them, when there is more than one, should be present and take part in conducting the examination.

7. The laws of the State do not designate the studies in which the applicant shall be examined, nor have the Trustees of the University expressed any opinion on the subject; but it is manifestly unfair to impose an examination in any study required for admission to a course which only a part of the competitors expect to enter.

8. Persons to be admitted to the examination must have been educated in the academies and public schools of the State, and *in the county* in which they offer themselves for the competition.

9. It is not understood that the applicants must necessarily be residents of the county in which they seek the scholarship, but only that they should have attended an academy or public school long enough to be entitled to be regarded as having obtained their education, or at least a part of it, in the county. The length of time is not fixed by law.

10. Nor is it regarded as necessary that the applicants shall come from the different Assembly Districts in those counties in which there are more than one such District. And in deciding upon the merits of the competitors and awarding the certificates, no regard need be paid to the Assembly District in which the applicant may have his residence, or may have attended the academy or public school, although the certificate must name the District for which the appointment is made.

11. No student who has once been admitted to the University and received any instruction therein, may be admitted to examinations as a competitor.

12. But it is not understood by the Trustees that the fact that a student who is otherwise qualified to be a competitor and to receive the appointment, ought to be debarred from his right to enter the examination, in consequence of having finished his studies and been out of school for one or two years; especially if during this time he has been occupied in providing the means of defraying his expenses while attending upon the University. Nor do they think that the fact of his having been engaged out of the county during this time and for the purpose above mentioned ought to work to his disadvantage.

13. If, however, the student has been attending school, whether a public or a private school, out of the county, for the period which intervenes between his attendance upon the schools in the county and his application to be received as a competitor, this, it is thought, ought to exclude him from the examination.

14. The certificate of scholarship must in all cases be awarded on the basis of the competitive examination as above described, and not on any examination held otherwise or elsewhere, or on any testimonials obtained from any other source.

15. In all cases of contested or duplicate certificates, the

Trustees have decided and instructed their Treasurer to accept the first certificate that is in due form and granted by the proper authorities in the several counties in said State whereby free scholarships are granted to the said University. The University proposes to leave all questions as to the regularity of the proceedings and the rights of the respective parties that may be claimants for the certificate to be adjusted in the county from which the student comes and by the authorities that reside there.

16. In case any student to whom a certificate has been awarded has died, resigned his certificate, or been expelled from the University, a new certificate, which may state the facts in the case, may be given by the Commissioners or Board of Education of the county, to one of those who were present and competitors at the examination on which the certificate was originally awarded, always giving preference to competitors in the order of superiority of scholarship.

17. The certificates thus given are good for four years from the time when the examination was held. And in case of a new certificate, as above provided, the certificate will be accepted for only that portion of the four years which remains unexpired.

18. No allowance will be made in any case for absence or non-attendance upon the University by any student holding a certificate of State Scholarship. His certificate secures him free tuition for only that part of the four years during which he is in attendance upon his University duties.

19. It will be seen from the above statements that only one examination and only one appointment can be made for any one year for the same District. Hence, if no appointment is made for any one year at the appropriate time during the year, no appointment can be made for that year at any subsequent time.

20. No vacancy that can be filled ever arises from the neglect to appoint or the non-appointment of a scholar for any District. Vacancies that can be filled can arise only by the appointees having been removed from the University for some cause or other.

21. No appointment can be made from any one county in the State to fill a vacancy in any Assembly District of the State in another county.

ENTRANCE EXAMINATION PAPERS.

ENGLISH GRAMMAR.

1. Embody in a connected account the following particulars: (*a*) name in full, (*b*) birth-place, (*c*) age, (*d*) school or schools where fitted, (*e*) intended course of study, (*f*) purpose in seeking a college education.

2. Give an example of a simple, of a derivative, and of a compound noun.

3. Why are nouns inflected?

4. State the parts of speech that are invariable or indeclinable.

5. What form of expression can be substituted for the possessive case?

6. Define *demonstrative*, *antecedent*, *interrogative*, *cardinal*, *transitive*, *passive*, *co-ordinating*, as used in grammar.

7. Write out a complex sentence with a subordinate clause in the present tense, subjunctive mood, underlining the clause.

8. Give an example of an impersonal verb.

9. Give a synopsis of the preterit of *build*; write the simple, emphatic, and progressive forms, in all the moods.

10. Analyze the following:

"To fear the worst oft cures the worst."

11. Parse the preceding sentence.

12. Justify or correct the following sentences:

With rational beings nature and reason is the same thing.
You are to slowly raise the trap, while I hold the sack.
Charles let his dollar drop in the creek.
She is fairer but not so amiable as her sister.
To these precepts are subjoined a copious selection of rules.
I could not buy it nor borrow it.
Replevin is when suit is brought to recover property.

13. Write a composition on one of the following subjects:
A Day at a Fair. Prohibition. The Telephone.

14. Define and illustrate the different kinds of conjunctions.

15. Decline the relative pronouns.

16. What is comparison of adjectives? State and illustrate the various methods of indicating the different degrees.

17. Define an abstract noun; a collective noun; give illustrations.

II. GEOGRAPHY.

1. Draw an outline map of Asia, and show thereon (1) the principal rivers and mountain chains; (2) the political divisions and chief cities.

2. Name the gulfs, seas, and bays, that border the coast of Asia.

3. Give some account of the Empire of China and state (1) its area; (2) its population; (3) its form of government; (4) its religion; (5) the chief industries of the people.

4. Name the five principal countries of Europe in the order of (1) their size; (2) their population; (3) their wealth; (4) the intelligence of their people, and their advancement in civilization.

5. Name the capitals of these five countries; give their populations, and their latitudes.

6. Give a general description of Africa; state its size, location, and physical characteristics.

7. State what parts of Africa are civilized, what parts are half civilized, and what parts are barbarous.

8. Draw an outline map of South America, and show its chief rivers, mountains, political divisions, and cities.

9. State what parts of South America have abundant rains, and what parts are dry; and give the reasons therefor.

10. Name the three principal political divisions of North America, and give their locations with reference to each other.

11. What states of the United States (including territories) may be called cotton states? what, grain states? what, mining states?

12. What part of the world's population is christian? what part is mohammedan? what part is buddhist?

III. PHYSIOLOGY.

1. Draw diagrams of the permanent teeth on one side of the upper jaw, and give their names. State the differences in num- and character between milk teeth and permanent teeth.

2. Draw an outline diagram of the alimentary canal, and name its parts.

3. Of what is the diaphragm composed? Draw diagrams showing its condition before and after inspiration.

4. What digestive actions are performed by the gastric juice? What ones can it not perform?

5. Draw a diagram of the right side of the heart showing the vessels and valves, and give their names.

IV. ARITHMETIC.

1. Define: arithmetic, multiplication, a decimal fraction, percentage, square root.

2. Write the value, both in Arabic numerals and in words of

$$[\text{MDCCCLXXXIII} \div 16.\dot{6}] \times [(2.5 - 1.25) \div .\dot{0}\dot{3}].$$

3. Add 387.5, 91.267, 5.608, .18, .009, 56.42,

$$1.2\tfrac{3}{4},\ \frac{65}{7.5},\ \frac{.018}{56.25},\ \frac{3.5}{8.75},\ \frac{8.8}{2.75}.$$

4. Define simple and compound interest, and explain the difference between them.

If a boy be 17 years old to-day, what sum of money must be put at simple interest (to-day) so that it shall amount to $5000 when he is 21 years old, and what sum at compound interest, the rate being 6 per cent. in both cases?

5. If a field be a kilometre long and three hundred metres wide, find its area in acres.

6. Get the cube root of 1729 correct to three decimal places.

State the general rule for getting cube root, and give reasons therefor.

V. PLANE GEOMETRY.

1. Define: an acute angle, a triangle, a pentagon, two similar polygons, a circle, a line tangent to a circle at a given point, a fourth proportional to three given lines, a limit.

2. If two opposite sides of a quadrilateral be equal and parallel the figure is a parallelogram.

3. If a circle of given radius be tangent to a given straight line, find the locus of its centre.

4. If through a fixed point O, either within or without a given circle, two straight lines be drawn to cut the circle respectively in the points A, A' and B, B', then the rectangle of the segments OA, OA' equals the rectangle of the segments OB, OB'.

If the point O be without the circle and the line OAA' touch the circle, what relation have A and A'? What does the rectangle OA, OA' then become?

5. Find two straight lines in the ratio of the areas of two given polygons.

6. An equiangular polygon circumscribed about a circle is regular.

VI. ALGEBRA, THROUGH QUADRATICS.

1. Define: algebra, a coefficient, multiplication, the lowest common multiple of two numbers, involution, an index of a root, a rational number.

2. If $a=2$, $b=3$, $x=6$, $y=5$, find the value of

$$\sqrt[3]{(a+b)^2 y}+\sqrt[3]{(a+x)(y-2a)}+\sqrt[3]{(y-b)^2 a}.$$

3. Find the highest common measure of

$$2x^6-11x^3-9 \text{ and } 4x^6+11x^4+81.$$

4. The length of a field is twice its breadth; another field, which is 50 yards longer and 10 yards broader, contains 6800 square yards more than the former; find the length, breadth, and area of each field.

5. Given $x+y+z=a+b+c$

$$\text{and } bx+cy+az=cx+ay+bz=a^2+b^2+c^2;$$

find the values of x, y, z.

6. Show that $\dfrac{(27a^4-18a^2b^2-b^4)^2}{64a^2b^4}+\dfrac{(9a^2-b^2)^3(b^2-a^2)}{64a^2b^4}=b^2.$

7. Solve the quadratic equation $3x^2-10x=25$, and by aid of its roots resolve the expression $3x^2-10x-25$ into two integral factors.

VII. SOLID GEOMETRY AND CONIC SECTIONS.

1. A plane is determined: 1st, by a straight line and a point without that line; 2d, by two intersecting straight lines; 3d, by three points not in the same straight line; 4th, by two parallel straight lines.

2. Two rectangular parallelopipeds having equal altitudes are to each other as their bases.

3. Two triangles on the same sphere are either equal or symmetrical when two sides and the included angle of the one are respectively equal to two sides and the included angle of the other.

4. A frustum of any cone is equivalent to the sum of three cones whose common altitude is the altitude of the frustum, and whose bases are the lower base, the upper base, and a mean proportional between the bases of the frustum.

5. To find two straight lines in the ratio of the volumes of two given cubes.

6. A perpendicular from either focus of an ellipse to any tangent, intersects the tangent on the circumference of a circle whose diameter is the transverse axis of the ellipse.

VIII. HIGHER ALGEBRA.

1. Sum to 10 terms the series $1\frac{3}{5}$, $1\frac{1}{5}$, $\frac{4}{5}$, etc.

2. Find the first term with a negative coefficient in the expansion of

$$(1+\tfrac{1}{3}x)^{\frac{11}{3}}.$$

3. Develop $\dfrac{1-2x+3x^2}{1+2x+3x_2}$ to 4 terms by the method of undetermined coefficients.

4. Convert $\frac{12763}{44136}$ into a continued fraction and find three convergents.

5. Transform the equation $\frac{3}{5}x^3-\frac{2}{5}x^2+\frac{3}{7}x-3=0$, into another equation in which the coefficients are whole numbers and that of the first term is unity.

6. By Horner's method find one root of the equation

$x^3-7x+7=0$ to two places of decimals.

IX. TRIGONOMETRY.

1. If the tangent of an angle be $\frac{3}{5}$, find all the other trigonometric functions of the angle.

2. Prove that $\sin 3A \operatorname{cosec} A-\cos 3A \sec A=2$.

3. Prove any two of the formulae which may be written by Napier's two rules and explain how a spherical right triangle may be solved.

4. Prove any one of Napier's analogies.

5. Prove that if θ be the circular measure of a positive angle less than a right angle the limit of the ratio $\sin\theta : \theta$, when θ is indefinitely diminished, is unity; but if degree measure be used, then

$$\lim\frac{\sin n^\circ}{n}=\frac{\pi}{180}.$$

6. In any plane triangle ABC given the side $a=9459.31$ feet,

the side $b=8032.28$ feet, and the included angle C equal to $55° 30' 26''$, find the side c and the angles A and B.

X. FRENCH.

Translate into French the following sentences:

1. If you see my sister, do not forget to tell her what I have told you, but do not show her the letter; I shall send it to her to-morrow.

2. My friend, I ask you to accompany me to-morrow to the country; promise it to me.

3. It was this river on whose banks the Romans gained their first victories.

4. Alexander said one day to Diogenes: "I see that you want many things; I should be glad to assist you; ask of me anything you like."

5. Spring and autumn are two fine seasons; the former gives us flowers and the latter fruits.

6. I shall depart in a fortnight for America; the journey will be effected in twelve days. I shall stay a week in New York, and I expect to be back to England in half a year.

7. Did it often rain when you were in Switzerland? No, but it used to snow very often.

8. What will you have, wine or water? I will take a glass of water; I never drink wine.

9. My brother's books are on the table. Where are yours and your sister's?

10. The room in which I live is eight feet high, and fourteen wide. How large is yours?

11. Should my friend bring me my hat, tell him to put it in my room, and call on my mother, who wants to see him.

12. The letters which I wrote were sent to the post-office an hour ago.

Translate into English:

Charles VII *fit* deux choses qui affermirent et régulerisèrent les conquêtes de ses prédécesseurs. Il *rendit* la taille et l'armée permanentes.

Par l'armée permanente, le roi eut désormais entre les mains une force tout à lui, et toujours disponible pour *réduire* les nobles. Auparavant, l'armée était la réunion des seigneurs, *venus* à l'appel du roi, pour servir durant un temps assez court, déterminé par la loi féodale.

Ce temps expiré, les seigneurs se séparaient, rentraient chez eux, l'armée était dissoute. Et puis, naturellement, cette armée de l'esprit féodal n'était pas très-maniable. Supposez que le roi *voulut* soumettre un de ses grands vassaux révolté; il arrivait d'abord que tous les petits seigneurs dépendant de ce grand vassal, au lieu de se rendre à l'armée du roi, *allaient* au contraire composer l'armée du grand vassal, et soutenir la révolte. Ceux mêmes qui venaient au roi ne se souciaient pas, pour la plupart, de lui donner un triomphe complet; ils *craignaient* de trop vaincre, sentant bien qu'il y avait entre eux et le vassal communauté d'intérêts. Ainsi l'armée féodale n'était ni commode ni sûre pour les rois; tandisque l'armée permanente, composée d'hommes qui se destinaient à vivre de la solde du roi, qui étaient sortis de leur foyer et de leur famille pour toujours, n'avait d'autre intérêt que du maître qui payait.

—LACOMBE, *Petite Histoire.*

* * * * * * *

L'homme n'est qu'un roseau, le plus faible de la nature; mais c'est un roseau pensant. Il ne *faut* pas que l'univers entier s'arme pour l'écraser. Une vapeur, une goutte d'eau suffit pour le tuer. Mais quand l'univers l'écraserait, l'homme serait encore plus noble que ce qui le tue, parce qu'il *sait* qu'il meurt; et l'avantage que l'univers a sur lui, l'univers n'en sait rien.

—PASCAL.

Give the first pers. sing. of indic. pres., imperfect preterite conditional, and imperfect subjunctive of verbs in italic.

XI. GERMAN.

Translate one of the passages, and answer the questions upon both of them.

I.

Es war ein Mädchen faul und wollte nicht spinnen, und die Mutter mochte sagen, was sie wollte, sie konnte es nicht dazu bringen. Endlich übernahm die Mutter einmal Zorn und Ungeduld, dass sie ihm Schläge gab, worüber es laut zu weinen anfing. Nun fuhr gerade die Königin vorbei, und als sie das Weinen hörte, liess sie anhalten, trat in das Haus und fragte die Mutter, warum sie ihre Tochter schlüge, dass man draussen auf der Strasse das Weinen hörte. Da schämte sich die Frau, dass sie die Faulheit ihrer Tochter offenbaren sollte, und sprach: "Ich kann sie nicht vom Spinnen abbringen, sie will

immer und ewig spinnen, und ich bin arm und kann den Flachs nicht herbeischaffen." Da antwortete die Königin: "Ich höre nichts lieber als Spinnen, und bin nicht vergnügter, als wenn die Räder schnurren; gebt mir eure Tochter mit ins Schloss, ich habe Flachs genug; da soll sie spinnen, so viel sie Lust hat." Die Mutter war's von Herzen gern zufrieden, und die Königin nahm das Mädchen mit. Als sie ins Schloss gekommen waren, führte sie es hinauf zu drei Kammern, die lagen von unten bis oben voll vom schönsten Flachs.

1. Give, with definite article, the nominative singular, genitive singular, and nominative plural of the nouns: *Mädchen* (1), *Schläge* (4), *Königin* (5), *Haus* (6), *Tochter* (7), *Strasse* (8), *Schloss* (15), *Herzen* (16).

2. Inflect throughout, singular and plural, *our older brother*.

3. Write the ordinal numbers from one to twenty-one.

4. Mention all the possessive adjectives, with their meanings.

5. State distinctly the different ways of forming the principal parts of verbs, with examples.

6. Define a separable, an inseparable, and a variable compound verb, with principal parts and definitions of each.

7. Give the principal parts of the verbs: *war* (1), *wollte* (1) *mochte* (2), *konnte* (2), *übernahm* (3), *anfing* (5), *fuhr vorbei* (5), *liess* (6), *trat* (6), *schlüge* (7), *führte* (18), *lagen* (19).

8. Synopsis in active and passive, indicative, subjunctive, and conditional, third, singular, of *abbringen* (10).

9. Explain the position of *waren* (18), *führte* (18).

10. What kind of subordinate sentences are respectively introduced by: *warum* (7), *dass* (7)?

II.

Wenn wir nun auf das ungeheure Gedränge in dem Corso zurückblicken, und die für einen Augenblick nur gereinigte Rennbahn gleich wieder mit Volk überschwemmt sehen, so scheinet uns Vernunft und Billigkeit das Gesetz einzugeben, dass eine jede Equipage nur suchen solle, in ihrer Ordnung das nächste ihr bequeme Gässchen zu erreichen und so nach Hause zu eilen. Allein es lenken gleich nach abgeschossenen Signalen einige Wagen in die Mitte hinein, hemmen und verwirren das Fussvolk, und weil in dem engen Mittelraume es einem einfällt, hinunter, dem andern hinauf zu fahren, so können beide nicht von der Stelle, und hindern oft die Ver-

nünftigern, die in der Reihe geblieben sind, auch vom Platz zu kommen. Wenn nun gar ein zurückkehrendes Pferd auf einen solchen Knoten trifft, so vermehrt sich Gefahr, Unheil und Verdruss von allen Seiten. Und doch entwickelt sich diese Verwirrung, zwar später, aber meistens glücklich. Die Nacht ist eingetreten, und ein jedes wünscht sich zu einigen Ruhe Glück.

1. Explain the derivation of the following words, and state clearly the force of each derivative element: *Gedränge* (1), *gereinigte* (2), *Stelle* (11), *Vernünftigern* (11), *glücklich* (16).

2. Give the English cognates of ten words in this passage.

XII. LATIN.

[For the courses in Arts, Literature, Philosophy, and History and Political Science.]

Caesar.

Translate (at sight):

Caesar in eam spem venerat, se sine pugna et sine vulnere suorum rem conficere posse, quod re frumentaria adversarios interclusisset. Cur etiam secundo proelio aliquos ex suis amitteret? cur vulnerari pateretur optime de se meritos milites? cur denique fortunam periclitaretur? praesertim cum non minus esset imperatoris consilio superare quam gladio. Movebatur etiam misericordia civium, quos interficiendos videbat: quibus salvis atque incolumibus rem obtinere malebat. B. C. I, 72.

Compare *optime*. Decline *vulnere*, *quibus salvis*.

Give the principal parts of *amitteret*, *pateretur*, *interficiendos*, *obtinere*. Inflect the last two verbs in the future indicative active and the imperfect subjunctive passive.

Give the reason for the mood and tense of *posse*, *interclusisset*; for the case of *re*, *imperatoris*, *quibus*. What would *cur amitteret* be in the direct discourse, and why?

Virgil.

Translate:

Quo te, Moeri, pedes? an, quo via ducit, in urbem?
O Lycida, vivi pervenimus, advena nostri,
quod nunquam veriti sumus, ut possessor agelli
diceret 'haec mea sunt: veteres migrate coloni.'
nunc victi, tristes, quoniam Fors omnia versat,
hos illi—quod nec vertat bene—mittimus haedos.

Ecl. IX, 1–6.

Translate:

Bina boum vobis Troia generatus Acestes
dat numero capita in navis; adhibete penates
et patrios epulis et quos colit hospes Acestes.
praeterea, si nona diem mortalibus almum
Aurora extulerit radiisque retexerit orbem,
prima citae Teucris ponam certamina classis;
quique pedum cursu valet et qui viribus audax
aut iaculo incedit melior levibusque sagittis,
seu crudo fidit pugnam committere caestu,
cuncti adsint meritaeque expectent praemia palmae.
ore favete omnes et cingite tempora ramis.'

Aen. V, 61–71.

Where were the Trojans at this time? State briefly the principal incidents of the book.

Account for the use of *bina*; for the case of *epulis*, *cursu*, *caestu*.

Give the derivation of *certamina*, *audax*, *iaculo*, *expectent*, giving prefix (if any), root, and suffix or suffixes employed to form the stem from the root, with the meaning of each of these parts.

Write out the last two verses above, dividing into feet and marking the cæsuras, and give the rules for the length of all penultimate and final syllables.

CICERO.

[Take I, if you have read the oration, otherwise 2.]

1. Translate:

Hic miramur hunc hominem tantum excellere ceteris, cuius legiones sic in Asiam pervenerint, ut non modo manus tanti exercitus, sed ne vestigium quidem cuiquam pacato nocuisse dicatur? Iam vero, quemadmodum milites hibernent, quotidie sermones ac litterae perferuntur; non modo, ut sumptum faciat in militem, nemini vis affertur, sed ne cupienti quidem cuiquam permittitur. Hiemis enim, non avaritiae perfugium maiores nostri in sociorum atque amicorum tectis esse voluerunt.

Manil., XIII.

What is the subject of the oration?

Distinguish between the uses of the genitive in *hiemis* and *avaritiae*: between the uses of the subjunctive in *dicatur* and *faciat*.

2. Translate:

Introduxi Volturcium sine Gallis: fidem ei publicam iussu

senatus dedi; hortatus sum, ut ea, quae sciret, sine metu indicaret. Tum ille dixit, cum vix se ex magno timore recreasset, a P. Lentulo se habere ad Catilinam mandata et litteras, ut servorum praesidio uteretur et ad urbem quam primum cum exercitu accederet: id autem eo consilio, ut, cum urbem ex omnibus partibus, quemadmodum descriptum distributumque erat, incendissent caedemque infinitam civium fecissent, praesto esset ille, qui et fugientes exciperet et se cum his urbanis ducibus coniungeret.

Cat. III, 4.

Account for the mood and tense of *sciret*, *coniungeret*.

Translate (at sight):

Quonam meo fato, patres conscripti, fieri dicam, ut nemo his annis viginti rei publicae fuerit hostis, qui non bellum eodem tempore mihi quoque indixerit? Nec vero necesse est quemquam a me nominari: vobiscum ipsi recordamini. Mihi poenarum illi plus quam optarem dederunt: te miror, Antoni, quorum facta imitere, eorum exitus non perhorrescere.

Phil. II, 1.

Account for the mood and tense of *indixerit*: for the case of *poenarum*.

Under what circumstances were the Philippics of Cicero composed, and in what year?

Composition.

Translate into Latin:

When Brutus entered the forum to address the people, he could scarcely be heard in the tumult. Every one was frightened, for no one could forget the murdered Caesar, nor did any one know who would next be put to death. The liberators, who were forced to take refuge in the Capitol, were urged[1] by Cicero not to treat with Antony. But they trusted in his professions of faith and hoped to win[2] him over to themselves.

[1] Suadeo. [2] Conciliare.

[For the course in Natural History.]

Caesar.

1. Translate:

Prima luce productis omnibus copiis, duplici acie instituta, auxiliis in mediam aciem coniectis, quid hostes consilii caperent exspectabat. Illi, etsi propter multitudinem et veterem belli gloriam paucitatemque nostrorum se tuto dimicaturos existimabant, tamen tutius esse arbitrabantur, obsessis viis, commeatu intercluso, sine ullo vulnere victoria potiri: et, si propter inopiam rei fru-

mentariae Romani sese recipere coepissent, impeditos in agmine et sub sarcinis infirmiore animo adoriri cogitabant.

B. G. III, 24.

Compare *prima*, *tutius*. Decline *acie*, *veterem*, *vulnere*.

Give the principal parts of *productis*, *instituta*, *adoriri*. Inflect *productis* in the future indicative passive, and *instituta* in the present subjunctive passive. Give the reason for the case of *luce*, *copiis*, *consilii*.

2. Translate:

Hac oratione habita, mirum in modum conversae sunt omnium mentes, summaque alacritas et cupiditas belli gerendi innata est, princepsque decima legio per tribunos militum ei gratias egit, quod de se optimum iudicium fecisset; seque esse ad bellum gerendum paratissimam confirmavit. Deinde reliquae legiones per tribunos militum et primorum ordinum centuriones egerunt, uti Caesari satisfacerent; se neque unquam dubitasse neque timuisse, neque de summa belli suum iudicium, sed imperatoris esse, existimavisse. Eorum satisfactione accepta, et itinere exquisito per Divitiacum, quod ex aliis ei maximam fidem habebat, ut milium amplius quinquaginta circuitu locis apertis exercitum duceret, de quarta vigilia, ut dixerat, profectus est.

B. G. I, 41.

Give the reason for the mood and tense of *fecisset*, *satisfacerent*, *existimavisse*, *habebat*.

3. Translate (at sight):

Caesar in eam spem venerat, se sine pugna et sine vulnere suorum rem conficere posse, quod re frumentaria adversarios interclusisset. Cur etiam secundo proelio aliquos ex suis amitteret? cur vulnerari pateretur optime de se meritos milites? cur denique fortunam periclitaretur? praesertim cum non minus esset imperatoris consilio superare quam gladio. Movebatur etiam misericordia civium, quos interficiendos videbat: quibus salvis atque incolumibus rem obtinere malebat.

B. C. I, 72

XIII. GREEK.

I.

Attic Prose.

Translate:

Ἐντεῦθεν ὑπολαβὼν Ἀγασίας Στυμφάλιος εἶπεν· Ἀλλὰ τούτῳ γε οὔτε τῆς Βοιωτίας προσήκει οὐδὲν οὔτε

τῆς Ἑλλάδος καντάκασιν· ἐπεὶ ἐγὼ αὐτὸν εἶδον ὥσπερ Λυδὸν ἀμφότερα τὰ ὦτα τετρυπημένον. Καὶ εἶχεν οὕτως. Τοῦτον μὲν οὖν ἀπήλασαν· οἱ δ᾽ ἄλλοι παρὰ τὰς τάξεις ἰόντες ὅπου μὲν στρατηγὸς σῶος εἴη τὸν στρατηγὸν παρεκάλουν· ὁπόθεν δὲ οἴχοιτο τὸν ὑποστρατηγόν· ὅπου δ᾽ αὖ λοχαγὸς σῶος εἴη τὸν λοχαγόν. Ἐπεὶ δὲ πάντες συνῆλθον, εἰς τὸ πρόσθεν τῶν ὅπλων ἐκαθέζοντο· καὶ ἐγένοντο οἱ συνελθόντες στρατηγοὶ καὶ λοχαγοὶ ἀμφὶ τοὺς ἑκατόν. Ὅτε δὲ ταῦτα ἦν σχεδὸν μέσαι ἦσαν νύκτες. Ἐνταῦθα Ἱερώνυμος Ἠλεῖος πρεσβύτατος ὢν τῶν Προξένου λοχαγῶν ἤρχετο λέγειν ὧδε· Ἡμῖν, ὦ ἄνδρες στρατηγοὶ καὶ λοχαγοί, ὁρῶσι τὰ παρόντα ἔδοξε καὶ αὐτοῖς συνελθεῖν καὶ ὑμᾶς παρακαλέσαι, ὅπος βουλευσαίμεθα εἴ τι δυναίμεθα ἀγαθόν. Λέξον δ᾽, ἔφη, καὶ σύ, ὦ Ξενοφῶν, ἅπερ καὶ πρὸς ἡμᾶς.
—XENOPHON, *Anabasis*, III, I, 31.

Define *enclitic* and *proclitic*, giving examples from the above passage. Give the nom. and gen. sing. of *ὦτα* and *τάξεις*, with the rule for the accentuation of those forms. Decline *ἐγώ* through all numbers. Compare *μέσαι*.

Give the principal parts of *εἶδον, ἀπηλασαν, συνῆλθον, ἔδοξε, δυναίμεθα*. How is the present of *ἐγένοντο* formed from the verb stem? Give the general rule for the accentuation of verbs, and point out some exceptions to it that occur in the above passage.

Give the reason for the opt. in *οἴχοιτο, βουλευσαίμεθα, δυναίμεθα*. Recount briefly the events immediately preceding those described in this passage of the Anabasis.

Translate (at sight):

Ἀγησίλαος τοίνυν ἔτι μὲν νέος ὢν ἔτυχε τῆς βασιλείας· ἄρτι δὲ ὄντος αὐτοῦ ἐν τῇ ἀρχῇ, ἐξηγγέλθη βασιλεὺς ὁ Περσῶν ἀθροίζων καὶ ναυτικὸν καὶ πεζὸν πολὺ στράτευμα ὡς ἐπὶ τοὺς Ἕλληνας· βουλευομένων δὲ περὶ τούτων Λακεδαιμονίων καὶ τῶν συμμάχων, Ἀγησίλαος ὑπέστη, ἐὰν δῶσιν αὐτῷ τριάκοντα μὲν Σπαρτιατῶν, δισχιλίους δὲ νεοδαμώδεις (freedmen), *εἰς ἑξακισχιλίους δὲ τὸ σύνταγμα τῶν συμμάχων, διαβήσεσθαι εἰς τὴν Ἀσίαν καὶ πειράσεσθαι εἰρήνην ποιῆσαι,*

ᾗ ἂν πολεμεῖν βούληται ὁ βάρβαρος, ἀσχολίαν (too much to do) αὐτῷ παρέξειν στρατεύειν ἐπὶ τοὺς Ἕλληνας. —Xenophon, *Agesilaus*, I, 6.

II.

Composition.

If King Agesilaus had not crossed over into Asia at that time, the Persians would have made an expedition against the Greeks with a great force of ships and men.

III.

Homer.

Translate:

ἄλλος δ' ἄλλῳ ἔρεζε θεῶν αἰειγενετάων,
εὐχόμενος θάνατόν τε φυγεῖν καὶ μῶλον Ἄρηος.
αὐτὰρ ὁ βοῦν ἱέρευσεν ἄναξ ἀνδρῶν Ἀγαμέμνων
πίονα, πενταέτηρον, ὑπερμενέϊ Κρονίωνι·
κίκλησκεν δὲ γέροντας ἀριστῆας Παναχαιῶν,
Νέστορα μὲν πρώτιστα καὶ Ἰδομενῆα ἄνακτα,
αὐτὰρ ἔπειτ' Αἴαντε δύω καὶ Τυδέος υἱόν,
ἕκτον δ' αὖτ' Ὀδυσῆα, Διὶ μῆτιν ἀτάλαντον.
αὐτόματος δέ οἱ ἦλθε βοὴν ἀγαθὸς Μενέλαος·
ᾔδεε γὰρ κατὰ θυμὸν ἀδελφεὸν ὡς ἐπονεῖτο.
βοῦν δὲ περιστήσαντο, καὶ οὐλοχύτας ἀνέλοντο
τοῖσιν δ' εὐχόμενος μετέφη κρείων Ἀγαμέμνων.
Ζεῦ κύδιστε, μέγιστε, κελαινεφές, αἰθέρι ναίων,
μὴ πρὶν ἐπ' ἠέλιον δῦναι, καὶ ἐπὶ κνέφας ἐλθεῖν,
πρίν με κατὰ πρηνὲς βαλέειν Πριάμοιο μέλαθρον
αἰθαλόεν, πρῆσαι δὲ πυρὸς δηΐοιο θύρετρα,
Ἑκτόρεον δὲ χιτῶνα περὶ στήθεσσι δαΐξαι
χαλκῷ ῥωγαλέον· πολέες δ' ἀμφ' αὐτὸν ἑταῖροι
πρηνέες ἐν κονίῃσιν ὀδὰξ λαζοίατο γαῖαν.

—*Iliad*, book II.

Where formed (tense, mood, voice), and from what verbs, are ᾔδεε, περιστήσαντο, ἀνέλοντο, λαζοίατο? Give the Attic form of these.—Explain the use of the inf. in l. 413, and the opt. in l. 418.—Scan ll. 400, 404, 410, and explain the quantity of the final syllable of ἄλλῳ (in l. 400), γέροντας, οὐλοχύτας.

FIFTEENTH ANNUAL COMMENCEMENT.

June 21, 1883.

I. THESES OF CANDIDATES FOR A BACCALAUREATE DEGREE.

Theses Presented to the Public.

1. John Lovejoy Pratt—*Oration*—Some Reforms of the Czar Alexander II.

2. De Witt Hiram McGraw—*Thesis in Botany*—Transpiration in Plants.

3. Clara Maria Smith—*Dissertation*—Masterpieces as Models in Literature and Art.

4. Charles Henry Anderson—*Oration*—Metternich and His Policy.

5. Harry Natt Hoffman—*Thesis in Horticulture*—The Pear-Blight.

6. Herbert Charles Elmer—*Oration*—The Limitation of Facts.

7. George Henry Thayer—*Oration*—Alexander Hamilton, the Statesman.

8. Albert Franklin Matthews—*Essay*—Chimes and the Art of Ringing them.

9. Asa Alling Alling—*The Woodford Oration*—Cromwell's and Gladstone's Policy towards Ireland.

Theses Receiving Honorable Mention.

10. Charles Irving Avery—The Mormon Question.

11. Edward Fitch Cushing—General Grant's Overland Campaign.

12. Edwin Duryea—Determination of Latitude.

13. JAMES HILLHOUSE FUERTES—Review of a Wrought Iron Railroad Bridge.

14. FREDERIC ARTHUR HOLTON—The Application of Electrolysis and of Pemberton's Method for the Determination of Phosphoric Acid in the Technical Analysis of Iron.

15. HARRY EDGAR LONGWELL—The Development of the Steam Engine as Influenced by the Mechanical Theory of Heat.

16. EDWIN PLACE—The Weston Dynamo.

17. ADALINE ELDRED PRENTISS—The Germ History of Man.

18. CHARLES SMITH PROSSER—The Geology and Comparative Palæontology of Brookfield, N. Y.

19. GEORGE CARTWRIGHT RAYNOR—Christianity as a Factor in the Evolution of Society.

20. FRED LEWIS RŒHRIG—Sanitary Precautions in House Building.

21. FRANK SHERMAN WASHBURN —Improved Railway Alignment.

II. THESES OF CANDIDATES FOR A SECOND DEGREE.

1. DANIEL WHEELER BOWMAN, B.C.E.—*In Civil Engineering*—Viaducts.

2. ROBERT PACKER GREEN, B.C.E.—*In Civil Engineering*—Wrought Iron Bridge Details.

3. ANNA MARILLA JOHNSON, A.B.—*In Literature*—"Pierce the Ploughman's Crede" as an Exponent of the Church of the Times.

4. GEORGE HENRY JOHNSON, B.S.—*In Mathematics*—Imaginary Quantities.

5. LELAND OSSIAN HOWARD, B.S.—*In Natural History*—The Characters of the the Chalcididæ.

6. ESSIE JOSEPHINE WATSON, A.B.—*In Literature*—Chaucer as a Satirist and Humorist.

III. PRIZES AWARDED.

The Woodford Prize in Oratory.

TO ASA ALLING ALLING.

The Horace K. White Prizes in Veterinary Science.

The first to . . . . . . CHARLES JOHN WALCH
The second to . . . . WILLIAM CHRISTOPHER KRAUSS

Dr. Law's Prize in Veterinary Science.

TO HERMAN WOODWORTH SMITH.

IV. DEGREES CONFERRED.

Bachelors of Arts.

Curtis, Charles Locke,
Diefendorf, Mary Riggs,
Dowling, Eunice,
Dwelle, William Delafield,
Elmer, Herbert Charles,
Marshall, Holmes,
Matthews, Albert Franklin,
McGraw, De Witt Hiram,
Wilcox, Fred Clarence,
Woodruff, Cora Eliza.

Bachelors of Literature.

Anderson, Charles Henry,
Boulton, Jessie Mary,
Crooker, Edward Henry,
Humphries, John Henry,
Pratt, John Lovejoy,
Prentiss, Evarts Lincoln,
Runyon, Frank Willits,
Smith, Clara Maria.

Bachelors of Philosophy.

Alling, Asa Alling,
Cushing, Edward Fitch,
Doubleday, Julia Louisa,
Eaton, William Moser,
Mapes, Arlington.

In History and Political Science.

Browning, Charles Ross,
Southwick, John Leonard,

Bachelors of Science.

In Science and Letters.

Avery, Charles Irving,
Avery, James Carrington,
Boyer, Lyman Fremont,
Brainard, George Austin,
Chase, Charles Curry,
Downing, Elizabeth,
Ehrman, Harry Friedman,
Lyon, John,
Maxwell, Emma Eliza,
Patterson, Roswell Henry,
Payne, Lewis Taber,
Preswick, Eugene Henry,
Raynor, George Cartwright,
Smith, Delano Eugene,
Smith, Herman Woodworth,
Sullivan, Frank Robert,
Thayer, George Henry,
Tinsley, Henry Greenwood.

In Science.

Prosser, Charles Smith.

In Chemistry and Physics.

Holton, Frederic Arthur.

In Natural History.

Prentiss, Adaline Eldred.

Bachelors of Agriculture.

Hoffman, Harry Natt,
Wilcox, Fred Elmer.

BACHELORS OF ARCHITECTURE.

RHODES, FRANCES, ROEHRIG, FRED LEWIS.

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LONGWELL, HARRY EDGAR, ROBERTS, WILLIS MARKEL,
RUGGLES, WILLIAM BENJAMIN.

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BEYE, JOHN CHARLES, PEARSON, EDWARD JONES,
DURYEA, EDWIN, REED, JAMES WILLIAM,
EWING, WILLIAM BION, SHELDON, DANIEL CORYDON,
FUERTES, JAMES HILLHOUSE, TURNER, EBENEZER TOUSEY,
PAGE, WILLIAM HENRY, WASHBURN, FRANK SHERMAN.

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JOHNSON, GEORGE HENRY, B.S., HOWARD, LELAND OSSIAN, B.S.

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JOHNSON, ANNA MARILLA, A.B., WATSON, ESSIE JOSEPHINE, A.B

CIVIL ENGINEERS.

GREEN, ROBERT PACKER, B.C.E., BOWMAN, DANIEL WHEELER, B.C.E

V. MID-COURSE HONORS AT COMMENCEMENT, 1883.

EMMA NEAL BASSETT, ... Latin
LUDLOW ELIAKIM LAPHAM, ... French
HENRY JAY PATTEN, ... History
HARRY LAURENCE SHIVELY, ... German and French
ANDREW CURTIS WHITE, A.B., . . . Greek and Latin

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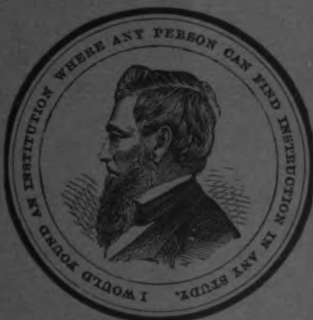
THE

CORNELL UNIVERSITY

REGISTER

1884-85



ITHACA, N. Y.

THE

CORNELL UNIVERSITY

REGISTER

1884-85

ITHACA, N. Y.

D. Mason & Co., Printers and Binders,
63 West Water Street,
Syracuse, N. Y.

CONTENTS.

THE CALENDAR.

1884–5.

FALL TERM—1884.

September	16	Tuesday	Entrance Examinations begin.
September	18	Thursday	REGISTRATION for the Term.
September	19	Friday	Instruction begins.
November	27 28	Thursday and Friday	THANKSGIVING.
December	12	Friday	Term Examinations begin.
December	19	Friday	Term ends.

WINTER TERM—1885.

January	6	Tuesday	Entrance Examinations begin.
January	8	Thursday	REGISTRATION for the Term.
January	9	Friday	Instruction begins.
January	11	Sunday	Founder's Day.
March	6	Friday	Woodford Prize Competition.
March	20	Friday	Term Examinations begin.
March	27	Friday	Term ends.

SPRING TERM—1885.

April	4	Saturday	REGISTRATION for the Term.
April	6	Monday	Instruction begins.
May	18	Monday	Commencement Essays due.

May	25	Monday	Theses for advanced degrees due.
June	1	Monday	Senior Examinations begin.
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June	12	Friday	Term Examinations end.
June	15	Monday	Entrance Examinations begin.
June	16	Tuesday	Class Day.
June	17	Wednesday	Alumni Day. Annual Meeting of the Trustees.
June	18	Thursday	ANNUAL COMMENCEMENT.

FALL TERM—1885-6.

September	15	Tuesday	Entrance Examinations begin.
September	17	Thursday	REGISTRATION for the Term.
September	18	Friday	Instruction begins.

ORGANIZATION AND GOVERNMENT.

FOUNDATION OF THE UNIVERSITY.

The existence of Cornell University is due to the bounty of the United States and of Ezra Cornell. On the second day of July, 1862, Congress passed an act granting public lands to the several States which should "provide at least one college where the leading objects shall be, without excluding other scientific and classical studies, and including military tactics, to teach such branches of learning as are related to agriculture and the mechanic arts." Thirty thousand acres for each of its senators and representatives in Congress were appropriated to every State; and the share of the State of New York was nine hundred and ninety thousand acres in land scrip.

On the twenty-seventh of April, 1865, the Legislature of New York incorporated "The Cornell University," appropriating to it the income arising from the sale of this land scrip. The most important conditions were, that Ezra Cornell should give to the University five hundred thousand dollars; that the University should give instruction in branches relating to agriculture, mechanic arts, and military tactics; and that it should receive, without charge for tuition, one student annually from each assembly district. Mr. Cornell fulfilled the first requirement of the charter, and made an additional gift of more than two hundred acres of land, with buildings, to be used as a farm in connection with the department of agriculture.

The Act of Incorporation satisfies the condition of the congressional grant by providing for instruction in such branches of learning as are related to agriculture and the mechanic arts, and in military tactics, "in order to promote the liberal and practical education of the industrial classes in the several pursuits and professions of life." And it further declares that "such other

branches of science and knowledge may be embraced in the plan of instruction and investigation pertaining to the University, as the trustees may deem useful and proper."

The University, organized in accordance with the requirements of its charter, was opened on the seventh of October, 1868.

TRUSTEES.

The number of trustees, when the Board is full, is twenty-three. The eldest male lineal descendant of the Founder is, by the law of the State, a trustee, as are also seven others, the President of the University, the Governor of the State of New York, the Lieutenant-Governor, the Speaker of the Assembly, the Superintendent of Public Instruction, the President of the State Agricultural Society, and the Librarian of the Cornell Library.

Of the remaining fifteen, two are elected annually by the trustees and one by the alumni. The term of every trustee not *ex officio* is five years.

FACULTY.

The Faculty consists of professors, associate professors, and assistant professors, and is aided by non-resident professors and lecturers, and by instructors and examiners. It comprises the following special faculties: Arts; Literature; Philosophy; Science; Agriculture; Architecture; Chemistry and Physics; Civil Engineering; Mathematics; Mechanic Arts; Natural History; and History and Political Science. The several special faculties constitute standing committees to which are referred questions relating to the departments under their control, but their action is subject to the approval of the general faculty.

STATE STUDENTS.

The ninth paragraph of the original Act of Incorporation provides for the admission of one student annually from each assembly district without payment of tuition. The number thus received, when all the scholarships are filled, is five hundred and twelve. These State students are to be selected, by yearly competitive examinations, from the various academies and public schools of the State. It is the duty of the school commissioners of counties and of the boards of education of cities to hold and conduct such examinations, and to award the scholarships. As

the law requires the selection of "the best scholar," no distinction on account of sex is recognized in the competition. For further details regarding this subject, see instructions with regard to Scholarships, under the appropriate head below.

OPTIONAL AND SPECIAL STUDENTS.

It was one of the leading objects in founding the University to provide for the wants of those who, though earnest and industrious students, cannot complete a full four-year course. The class distinctions which are in most cases strictly observed elsewhere, are not regarded by the Faculty of the University as any obstacle to recitation and attendance upon lectures with any class which the student is prepared to join.

Special students are admitted for a limited period without examination. They must be twenty-one years old, and of approved character and attainments.

GRADUATE STUDENTS.

For purposes of advanced study the University extends its privileges to its own graduates, and to graduates of like standing from other colleges and universities, and it confers advanced degrees under conditions described elsewhere; but graduate students who are not candidates for a degree are received in any department, and for any length of time.

HIGHER EDUCATION OF WOMEN.

By an act of the trustees, passed in April, 1872, women are admitted to the University on the same terms as men, except that they must be seventeen years old. A separate building, the Sage College, has been erected and furnished for their residence. The entrance examinations and all the studies, except military science, are the same for women as for men.

In view of the superior advantage to lady students afforded by the Sage College, it has been decided that hereafter "all lady students of the University shall be required to room and board in Sage College, unless specially excused for due cause shown, by the Sage College Committee." This committee is composed of the chairman of the Board of Trustees and the President and Treasurer of the University. Any ladies wishing to enter the University, who can assign really valid reasons for residing else-

where than in Sage College, should send in a request with reasons for it, at the earliest date possible, to the President of the University.

In order to give Sage College more of the safeguards of a well ordered home, and to bring its inmates directly under an influence akin to that of the family, the Trustees, during the year 1884–5, have established a lady principalship, the intention being to have a lady of high character, attainments, and social position living at the college, associating with its students, ready to give suggestions as to their general culture, and counsel in special matters at any moment, and to act toward them at all times as a friend and adviser.

The lady called to this position is Mrs. Agnes M. Derkhiem, formerly of Philadelphia, and her success thus far seems to leave no doubt as to the wisdom of the new arrangement.

Additional provision has also been made for physical culture in the Sage College Gymnasium. The Professor, Edward Hitchcock, Jr., M. D., and his assistant in this department, have organized a system of physical exercises calculated to maintain and develop the physical strength of young women, and at the same time to prevent any of the evils which might arise from exercises that are too violent or too long continued.

The exercises thus provided for are obligatory upon all residents of the college, subject to exceptions in particular cases by the Lady Principal and by Dr. Hitchcock.

RELIGIOUS SERVICES.

The University, established by a government which recognizes no distinction of religious belief, seeks neither to promote any creed, nor to exclude any. By the terms of its charter, persons of any religious denomination or of no religious denomination are equally eligible to all offices and appointments, but it is expressly ordered that "at no time shall a majority of the board of trustees be of any one religious sect, or of no religious sect."

In the University Chapel—the gift of the Hon. Henry W. Sage—religious services are held, and discourses delivered by eminent clergymen selected from the various Christian denominations.

PHYSICAL CULTURE.

For the physical training and development of students there has been provided a Gymnasium, thoroughly equipped with baths

and all necessary appliances for bodily culture. This is under the charge of an experienced physician, the Professor of Physical Culture and Director of the Gymnasium, who examines every student at his entrance and at stated intervals thereafter, learns the condition of his health, takes his physical measurements, and prescribes such exercises as may be required for his complete and symmetrical bodily development. The gymnasium is also open to all members of the University for voluntary exercise; but the Professor of Physical Culture is in constant attendance, and no student is suffered to indulge in hazardous or excessive athletic efforts, or to attempt any feat which in his individual case might be attended with risk. A supplementary gymnasium at the Sage College for the lady students, is conducted on the same general plan. In the physical training of the students the practical instruction in military science is found a valuable aid.

CHRISTIAN ASSOCIATION.

The Christian Association is an organization of students and professors for the promotion of their religious culture, and for Christian work in the University. Rooms have been fitted up for its use in White Hall, where meetings are held once a week or oftener. A committee of this association is in attendance at Association Hall during the first week of every fall term for the purpose of assisting those entering the University with information in regard to rooms, board, times and places of examinations, etc., and in general to afford any assistance in their power which students who are strangers in Ithaca may feel inclined to seek from them.

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The President of the University, ...	*Ex officio.*
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His Honor the Lieutenant-Governor, . . .	"
The Speaker of the Assembly, ...	"
The Superintendent of Public Instruction, . .	"
The President of the State Agricultural Society,	"
The Librarian of the Cornell Library, . . .	"

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FACULTY.

ARRANGED, WITH THE EXCEPTION OF THE OFFICERS OF THE FACULTY, IN THE ORDER OF SENIORITY OF APPOINTMENT.

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PRESIDENT, *Professor of History.*

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REGISTRAR, *Professor of Moral and Intellectual Philosophy.*

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ALBERT NELSON PRENTISS, M.S., University Grounds
Professor of Botany, Horticulture, and Arboriculture.

JOHN LEWIS MORRIS, A.M., C.E., University Grounds
Sibley Professor of Practical Mechanics and Machine Construction.

THOMAS FREDERICK CRANE, A.M., University Grounds
Professor of the Romance Languages and Literatures.

CHARLES ASHMEAD SCHAEFFER, A.M., Ph.D., 103 E. Seneca St.
Professor of General and Analytical Chemistry, and of Mineralogy.

FREDERICK LOUIS OTTO RŒHRIG, Ph.D., M.D., University Grounds
Professor of Sanskrit and Living Asiatic Languages.

HIRAM CORSON, A.M., LL.D., Cascadilla Cottage
Professor of Anglo-Saxon and English Literature.

WATERMAN THOMAS HEWETT, A.M., Ph.D., University Grounds
Professor of the German Language and Literature.

LUCIEN AUGUSTUS WAIT, A.B., University Grounds
Associate Professor of Mathematics.

ISAAC FLAGG, Ph.D., Cor. Hazen and Mitchell Sts.
Professor of the Greek Language and Literature.

CHARLES CHAUNCY SHACKFORD, A.M., University Grounds
Professor of Rhetoric and General Literature.

THE REV. CHARLES BABCOCK, A.M., University Grounds
Professor of Architecture.

JAMES EDWARD OLIVER, A.M., 69 Heustis St.
Professor of Mathematics.

WILLIAM ARNOLD ANTHONY, Ph.B., 9 W. Buffalo St.
Professor of Physics and Experimental Mechanics.

ESTEVAN ANTONIO FUERTES, C.E., 170 E. State St.
Professor of Civil Engineering.

EDWIN CHASE CLEAVES, B.S., Cortland
Associate Professor of Freehand Drawing and Mechanical Drawing.

ISAAC PHILLIPS ROBERTS, M.Agr., University Grounds
Professor of Agriculture.

CHARLES LEE CRANDALL, C.E., 100 Hector St.
Assistant Professor of Civil Engineering.

IRVING PORTER CHURCH, C.E., 151 E. Seneca St.
Assistant Professor of Civil Engineering.

HORATIO STEVENS WHITE, A.B., University Grounds
Professor of the German Language and Literature.

JOHN HENRY COMSTOCK, B.S., University Grounds
Professor of Entomology and General Invertebrate Zoölogy.

WILLIAM RUSSELL DUDLEY, M.S., 108 Cascadilla
Assistant Professor of Cryptogamic Botany.

GEORGE WILLIAM JONES, A.M., 17 Factory St.
Assistant Professor of Mathematics.

SAMUEL GARDNER WILLIAMS, A.M., Ph.D.,
Corner Green and Albany Sts.
Professor of General and Economic Geology.

HENRY SHALER WILLIAMS, Ph.D., University Grounds
Professor of Palæontology.

WILLIAM RUFUS PERKINS, A.B., 23 Quarry St.
Assistant Professor of History.

GEORGE SYLVANUS MOLER, A.B., B.M.E.,
156 N. Aurora St.
Assistant Professor of Physics.

WILLIAM GARDNER HALE, A.B., University Grounds
Professor of the Latin Language and Literature.

JOHN BURKITT WEBB, C.E., 130 E. Buffalo St.
Professor of Applied Mathematics and Theoretical Mechanics.

SIMON HENRY GAGE, B.S., 148 Cascadilla
Assistant Professor of Physiology, and Lecturer on Microscopical Technology.

CHARLES FRANCIS OSBORNE, 58 Cascadilla
Assistant Professor of Architecture.

THE REV. MOSES COIT TYLER, LL.D., L.H.D.,
135 E. Seneca St.
Professor of American History.

SPENCER BAIRD NEWBURY, E.M., Ph.D.,
University Grounds.
Assistant Professor of General Chemistry, Mineralogy, and Assaying.

HERBERT TUTTLE, A.M., University Grounds
Associate Professor of the History and Theory of Politics, and of International Law.

HENRY CARTER ADAMS, Ph.D., ———
Associate Professor of Political Economy.

WALTER SCRIBNER SCHUYLER, 1st Lieut. 5th Cav., U.S.A., 81 E. Buffalo St.
Professor of Military Science and Tactics.

WALTER MARTIN MCFARLAND, Assist. Engineer, U.S.N., 23 Quarry St.
Assistant Professor of Mechanical Engineering.

EDWARD HITCHCOCK, JR., A.M., M.D., 100 Cascadilla
Acting Professor of Physical Culture and Director of the Gymnasium.

CHARLES DAVID MARX, C.E., Professor Wait's
Assistant Professor of Civil Engineering.

GEORGE WILLIAM HARRIS, Ph.B., 142 E. Seneca St.
Acting Librarian.

LECTURERS AND NON-RESIDENT PROFESSORS.

GOLDWIN SMITH, LL.D., L.H.D., Toronto, Canada
Lecturer on English Constitutional History.

CHARLES KENDALL ADAMS, LL.D., Ann Arbor, Mich.
Non-Resident Professor of English Constitutional History.

FRANK B. SANBORN, M.A., [illegible]

Instructor in German.

HENRY WINCHESTER ROLFE, A.B., 69 Heustis St.
Instructor in Rhetoric and Composition.

Frederick Arthur Holton, B.S., 41 White Hall
Instructor in Chemistry.

James McMahon, A.B., 69 Heustis St.
Instructor in Mathematics.

Paul Daniel Brun, Osmond Place
Instructor in French.

James Lund, B.S., University Avenue
Instructor in Chemistry.

Herbert Mills Perry, A.B., Professor Wait's
Examiner in Mathematics.

William Collier Dole, Jr., 92 Cascadilla
Instructor in Gymnastics.

OTHER OFFICERS.

Wesley Newcomb, M.D., 26 E. Seneca St.
Curator of the Newcomb Collection of Shells.

Fred Lucius Kilborne, B.Agr., University Grounds
Anatomical Preparator.

George W. Tailby, University Grounds
Foreman of the Farm.

Miles Loring Clinton, 65 Cascadilla
Foreman of the Machine Shop.

William Ogden Kerr, 101 Cascadilla
Meteorological Observer.

Fred Clarkson Fowler, 75 W. Mill St.
Special Mechanical Assistant.

Harry Falkenau, 69 Eddy St.
Master of the Chimes.

SPECIAL FACULTIES.

The President of the University is *ex officio* Chairman of each of the special faculties. In the absence of the President, the Professor whose name is printed first on the list of its members, is the acting Chairman.

ARTS—Professor FLAGG, Professors ANTHONY, HALE, OLIVER, SHACKFORD, WILSON, and PERKINS.

LITERATURE — Professor SHACKFORD, Professors CORSON, CRANE, HALE, HEWETT, WAIT, H. S. WHITE, WILDER, and WILSON.

PHILOSOPHY—Professor WILSON, Professors ANTHONY, COMSTOCK, CRANE, OLIVER, PRENTISS, SCHAEFFER, H. S. WHITE, H. S. WILLIAMS, S. G. WILLIAMS, and WILDER.

SCIENCE—Professor ANTHONY, Professors COMSTOCK, CRANE, HEWETT, PRENTISS, SCHAEFFER, WAIT, H. S. WILLIAMS, S. G. WILLIAMS, WILDER, and WILSON.

AGRICULTURE—Professor Roberts, Professors CALDWELL, COMSTOCK, LAW, PRENTISS, and S. G. WILLIAMS.

ARCHITECTURE — Professor BABCOCK, Professors FUERTES, OLIVER, CLEAVES, and OSBORNE.

CHEMISTRY AND PHYSICS—Professor SCHAEFFER, Professors ANTHONY, CALDWELL, MOLER, and NEWBURY.

CIVIL ENGINEERING—Professor FUERTES, Professors ANTHONY, BABCOCK, MORRIS, OLIVER, SCHAEFFER, CHURCH, CRANDALL, and MARX.

MATHEMATICS—Professor OLIVER, Professors ANTHONY, BABCOCK, FUERTES, MORRIS, WEBB, WAIT, and JONES.

THE SIBLEY COLLEGE OF MECHANIC ARTS—Professor MORRIS, Professors ANTHONY, BABCOCK, FUERTES, WEBB, WAIT, CLEAVES, and McFARLAND.

NATURAL HISTORY—Professor PRENTISS, Professors COMSTOCK, LAW, WILDER, H. S. WILLIAMS, S. G. WILLIAMS, WILSON, DUDLEY, and GAGE.

HISTORY AND POLITICAL SCIENCE—Professor A. D. WHITE, Professors CRANE, HALE, TUTTLE, TYLER, H. S. WHITE, WILSON, PERKINS, and H. C. ADAMS.

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THE MUSEUM OF NATURAL HISTORY.

COUNCIL OF THE MUSEUM OF NATURAL HISTORY.

The PRESIDENT of the University, *ex officio;* WILLIAM R. HUMPHREY, Esq., of the Board of Trustees; Professors COMSTOCK, LAW, PRENTISS, WILDER, S. G. WILLIAMS, H. S. WILLIAMS, WILSON, DUDLEY, and GAGE, of the Faculty.

THE UNIVERSITY GYMNASIUM.

GYMNASIUM COUNCIL.

The PRESIDENT, *ex officio;* GEORGE R. WILLIAMS, Esq., of the Trustees; the Professor of Physical Culture, Professor HITCHCOCK; of Military Science, Professor SCHUYLER; of Physiology, Professor WILDER, *ex officiis.*

COMMITTEE ON DRILL AND MILITARY SCIENCE.

Professors SCHUYLER, HITCHCOCK and WILSON.

UNIVERSITY PREACHERS, 1884–5.

(On the Dean-Sage Foundation.)

FALL TERM.

Sept. 28—The Rev. S. J. McPherson, D.D., of Chicago, Ill.

Oct. 5—The Rev. O. H. Tiffany, D.D., of New York City.

Oct. 12—The Rev. Edward Everett Hale, D.D., of Boston Mass.

Oct. 19—The Rev. Edward Judson, D.D., of New York City.

Oct. 26—The Rev. Charles R. Baker, of Brooklyn, N. Y.

Nov. 2—The Rev. Joseph Anderson, D.D., of Waterbury, Ct.

Nov. 9—The Rev. Theodore W. Hopkins, of Rochester, N. Y.

Nov. 16—The Rev. Bishop Cyrus D. Foss, D.D., LL.D., of Minneapolis, Minn.

Nov. 23—The Rev. Professor Francis Greenwood Peabody, of Cambridge, Mass.

Nov. 30—The Rev. C. D. W. Bridgman, D.D., of New York City.[1]

SPRING TERM.

April 12—The Rev. Joseph T. Duryea, D.D., of Boston, Mass.

April 19—The Rev. James M. Whiton, Ph.D., of Newark, N. J.

April 26—The Rev. Isaac Errett, D.D., of Cincinnati, O.

May 3—The Rev. John R. Paxton, D.D., of New York City.

May 10—The Rev. Bishop Wm. X. Ninde, D.D., of Evanston, Ill.

May 17—The Rev. Robert Collyer, of New York City.

May 24—The Rev. Wayland Hoyt, D.D., of Philadelphia, Pa.

May 31—The Rev. Charles C. Tiffany, D.D., New York City.

June 7—The Rev. Joseph R. Twichell, of Hartford, Ct.

June 14—(Baccalaureate Sermon). The Rev. Alexander McKenzie, of Cambridge, Mass.

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[1] The Rev. Dr. Bridgman, being unable to fulfill his appointment, the sermons were preached by the Rev. S. R. Calthorp, D.D., of Syracuse.

CATALOGUE OF STUDENTS.

FELLOWS FOR 1884–5.

(See p. 124).

THE CORNELL FELLOWSHIP,
Charles Smith Prosser, B.S., *Natural History*

THE McGRAW FELLOWSHIP,
Frank Sherman Washburn, B.C.E., *Civil Engineering*

THE SAGE FELLOWSHIP,
Harriet Elizabeth Grotecloss, B.S., *Entomology and Botany*

THE SCHUYLER FELLOWSHIP,
James Gilbert White, A.B. (Pa. State), *Electrical Engineering*

THE SIBLEY FELLOWSHIP,
Edward Charles Murphy, B.C.E., *Mathematics*

THE GOLDWIN SMITH FELLOWSHIP,
Ernest Emory Russell, Ph.B., *History and Political Science*

THE PRESIDENT WHITE FELLOWSHIP,
Andrew Curtis White, A.B. (Hamilton), *Classical Philology*

RESIDENT GRADUATES.

Arthur, Joseph Charles, B.S., M.S., Botany and Entomology
Iowa Agricultural College.

Baltzell, Winton James, A.B., History and Literature
Lebanon Valley College.

Cox, William Stakely, B.E., Architecture
State College of Alabama.

Curnow, George Trevilyan, B.M.E., Architecture and Miscellaneous Drafting

Cushing, Harry Platt, Ph.B., M.S., Geology

Fay, Frederick Willis, A.B., Architecture
Ohio State University.

Furry, Frank Eugene, B.S., Chemistry
Iowa State College.

Gage, Kitty Augusta, A.B., Ancient Languages
Boston University.

Hainer, Julius Cæsar, A.B., Physics
Iowa Agricultural College.

Huffcut, Ernest Wilson, B.S., History and Political Science

Kerr, Milton Royce, B.S., Geology and Palæontology

Linthicum, Cadwallader Edwards, A.B., Civil Engineering
Yale College.

Messenger, Hiram John, Lit.B., Mathematics

Mineah, Mary Anna, A.B., History and English Literature
Vassar College.

Naeseth, Christen Andreos, A.B., History and English Literature
Norwegian Lutheran College.

Parr, Samuel Wilson, B.S., Natural History
University of Illinois.

Peck, Ezra Jones, A.B., A.M., Classical Philology
Williams College.

Petit, Amelie Veronica, Ph.B., Ph.M., Modern Languages
Syracuse University.

Robinson, Jennie Justina, A.B., History and Political Science
Smith College.

Turner, Ebenezer Tousey, B.C.E., Chemistry and Physics

Turner, William Savage, B.S. and M.S., Electrical Engineering
Knox College.

Tuthill, Lewis Henry, A.B., Classical Languages and Literature

UNDERGRADUATES.

SCHOLARSHIPS FOR 1884–8.

(See p. 124).

UNIVERSITY SCHOLARSHIPS.

THE CORNELL SCHOLARSHIP,

Lyman Austin Best, *Course in Civil Engineering*
Hornell Free Academy—D. L. Freeborn, A.B., LL.B., Principal.

THE H. B. LORD SCHOLARSHIP,

William Clark Fisher, *Course in Arts*
Onondaga Academy—O. W. Sturdevant, A.M., Principal.

THE McGRAW SCHOLARSHIP,

Alvah Deyo Hasbrouck, *Course in Civil Engineering*
J. R. Leslie, A.M., Private School, Poughkeepsie.

THE SAGE SCHOLARSHIP,

Henry Burrowes Lathrop, *Course in Arts*
At home with his father, the Rev. H. D. Lathrop, D.D., Walla Walla, W. T.

THE SIBLEY SCHOLARSHIP,

Andrew Spencer, Jr., *Course in Science and Letters*
Cooperstown Union School—J. G. Wright, A.M., Principal.

THE PRESIDENT WHITE SCHOLARSHIP,

Mary Margarette Wardwell, *Course in Architecture*
Buffalo High School—H. P. Emerson, A.M., Principal.

SAGE SCHOLARSHIPS FOR WOMEN.

Lottie Irene Earll, *Course in Arts*
Syracuse High School—G. A. Bacon, A.B., Ph.D., Principal.

Gertrude Gladys France, *Course in Arts*
Skaneateles Union School—F. C. Whitney, A.B., Principal.

Mary Anna Widman, *Course in Philosophy*
Freeport (Ill.) High School—A. W. Greene, B.C.E., Principal.

SENIORS.

Atkinson, George Francis,	*Monroe, Mich.*,	Philosophy
Avila, Arao Ferreira de,	*San Paulo, Brazil*,	Elect. Eng.
Baker, Edward Everett,	*Cedar Hill*,	Science and Letters
Benedict, Frederick Staples,	*Brockport*,	Architecture
Bennett, Burton Ellsworth,	*North Brookfield*,	Sc. and Letters
Bickford, Chauncey Howard,	*Belleville*,	Arts
Bliss, Russell Joseph,	*Peterboro*,	Philosophy
Bostwick, Edward Hermon,	*Ithaca*,	Science and Letters
Breed, Arthur Minier,	*Big Flats*,	Agriculture
Brooks, Edgar Gerson,	*Salt Lake City, Utah*,	Sc. and Let.
Bull, John, Jr.,	*Slaterville*,	Science and Letters
Chappell, Fred Martin,	*Montezuma*,	Natural History
Church, Wilmer,	*High Falls*,	Mechanic Arts
Clock, Cora May,	*Ithaca*,	Science and Letters
Coimbra, Anastacio Rodrigues de Aquino,	*Tres Ilhas, Brazil*,	Optional
Comstock, Anna Botsford,	*Ithaca*,	Natural History
Cooper, Edgar Howland,	*New York City*,	Civil Engin'ing
Corser, Mary Elwood,	*Minneapolis, Minn.*,	Literature
Cummings, Frederick Douglas,	*Tully*,	Science and Letters
Curtis, Charles Elbert,	*Ithaca*,	Civil Engineering
Dearstyne, Florence Evelyn,	*Sandy Hill*,	Science and Letters
Doolittle, Clarence Everett,	*Washington, D. C.*,	Elect. Eng.
Eidlitz, Robert James,	*New York City*,	Architecture
Elliott, Orrin Leslie,	*Centreville*,	Hist. and Polit. Sc.
Falkenau, Harry,	*Chicago, Ill.*,	Literature
Fisher, Bertrand Hand,	*Wellington, O.*,	Civil Engineer'g
French, James Benton,	*New Hartford*,	Civil Engineering
Good, Arthur Carroll,	*Buffalo*,	Science and Letters
Halbert, Henry Daniel,	*Vanceburg, Ky.*,	Civil Eng.
Harris, Rollin Arthur,	*Jamestown*,	Philosophy
Hartzell, Albert Ankeny,	*Buffalo*,	Science and Letters
Hough, Elida Crofoot,	*Lowville*,	Arts
Kelley, Charles Lester,	*Arcadia*,	Civil Engineering

Lain, David Emmet,	*West Town,*	Electrical Eng.
Larned, Francis Madison,	*Chicago, Ill.,*	Literature
Lillis, Thomas Francis,	*Coventryville,*	Civil Engineering
Lima, Casimiro Eugenio Amoroso,	*Rio Janeiro, Brazil,*	Agriculture
McCall, James,	*Bath,*	Arts
Merry, Martha,	*Phœnix,*	Science and Letters
Mosscrop, Alfred Mitton,	*Brooklyn,*	Civil Engineering
Olmsted, Henry Collier,	*Binghamton,*	Arts
Penny, George Barlow,	*Haverstraw,*	Science and Letters
Powell, George Wilson,	*Reed's Corners,*	Civil Eng.
Seeley, Florence Corinne,	*Rochester,*	Literature
Smith, Charlotte,	*Smith's Mills,*	Philosophy
Smith, Charles Henry,	*New Haven,*	Mechanic Arts
Smith, Jeannie Azilla,	*Bath,*	Science and Letters
Smith, Wilbur Hazleton,	*Little Valley,*	Arts
Smith, William Charles,	*Bath,*	Civil Engineering
Snow, Benjamin Warner,	*La Salle, Ill.,*	Chem. and Physics
Snyder, Charles Earl,	*Herkimer,*	Science and Letters
Stevens, Stoddard More,	*Rome,*	Hist. and Pol. Science
Stowell, William Mix,	*Brighton,*	Mechanic Arts
Van Sickle, John,	*Cayuga,*	Science and Letters
Van Vranken, George Williamson,	*Lisha's Kill,*	Hist. and Pol. Sc.
Ware, Richard,	*Washington, D. C.,*	Arts
Weston, William Henry,	*Philadelphia, Pa.,*	Elect. Eng.
Whaley, James Higgins,	*Rome,*	Natural History
Willard, Julia Etta,	*Watertown,*	Literature

JUNIORS.

Austin, Ennis Raymond,	*Owasco,*	Architecture
Baker, Charles Hinckley,	*Chicago, Ill.,*	Civil Engineering
Baker, Howard Winfield,	*Chicago, Ill.,*	Civil Engineering
Barney, William Grant,	*Elmira,*	Science and Letters
Barton, Philip Price,	*Lock Haven, Pa.,*	Hist. and Pol. Sc.
Beardsley, Harry Merchant,	*Elmira,*	Hist. and Pol. Science
Brodie, Hugh,	*Woodville,*	Science and Letters
Brundage, Charles Hubert,	*Penn Yan,*	Optional

Cahill, Rose Hannah,	*Binghamton*,	Philosophy
Carolan, Herbert,	*San Francisco, Cal.*,	Sc. and Let.
Cassidy, Jessie Jane,	*Brooklyn*,	Architecture
Chapman, Ernest Albert,	*Groton*,	Science and Letters
Charpiot, Henry Charles,	*Denver, Col.*,	Science and Let.
Converse, Frank Alvah,	*Woodville*,	Agriculture
Coville, Addison Luzerne,	*Oxford*,	Natural History
Curtis, Annie Neale,	*Boston, Mass.*,	Sc. and Letters
Darlington, William,	*West Chester, Pa.*,	Mechanic Arts
Day, William Asher,	*Wilbraham, Mass.*,	Mechanic Arts
Devin, Abe,	*Des Moines, Iowa*,	Mech. Arts
Dunham, Andrew Ellsworth,	*Sauquoit*,	Science and Letters
Dunham, Fredd Hall,	*Johnsonsburg*,	Sc. and Letters
Dusinberre, George Brown, Jr.,	*Geneva*,	Electrical Engineering
Ehle, Boyd,	*Fort Plain*,	Civil Engineering
Eltinge, Maurice Wurts,	*New Paltz*,	Science and Letters
Emory, Arthur Theodore,	*Unadilla*,	Arts
Fitts, Fay Martin,	*Dresserville*,	Science and Letters
French, Eldon Lewis,	*Housatonic, Mass.*,	Elect. Eng.
Gadsby, Herbert Hume,	*Gilbertsville*,	Arts
Gillette, Henry Taft,	*Cherry Valley*,	Science and Let.
Grant, Arthur Hastings,	*New York City*,	Civil Eng.
Harris, Gilbert Dennison,	*Jamestown*,	Philosophy
Hawley, Abraham Lincoln,	*Taylor*,	Civil Engineering
Hill, Robert Thomas,	*Comanche, Texas*,	Nat. History
Hinman, Delon Marcus,	*Denver, Col.*,	Optional
Hoffeld, Henry Rudolph,	*Lancaster*,	Civil Engineering
Howard, Frank Thurber,	*Ithaca*,	Arts
Howland, Herbert Slocum,	*Sherwood*,	Optional
Hubbard, Walter Stacy,	*Portville*,	Optional
Hull, Charles Henry,	*Ithaca*,	Hist. and Pol. Science
Hyatt, Louis Eugene,	*Lansingburg*,	Hist. and Pol. Sc.
Ingalls, Owen Lovejoy,	*Peterboro*,	Civil Engineering
Kittredge, Helen,	*Boston, Mass.*,	Sc. and Letters
Lima, Elias David Abinun de,	*New York City*,	Sc. and Letters
Loeser, Abraham,	*Buffalo*,	Science and Letters
Lorber, Lewis James Edward Joseph,	*Ithaca*,	Arts
McCann, George,	*Elmira*,	Science and Letters
Merritt, Ernest George,	*Indianapolis, Ind.*,	Elect. Eng.

Meyer, Rachel,	*Ithaca*,	Philosophy
Mooney, Margaret Elizabeth,	*Ithaca*,	Science and Letters
Nef, John Jacob,	*Housatonic, Mass.*,	Mech. Arts
Nourse, Sarah Cornelia,	*Ithaca*,	Science and Letters
Olin, Franklin Walter,	*Buskirk's Bridge*,	Optional
Packard, Allyn Augustus,	*St. Louis, Mo.*,	Architecture
Paddock, Anna Maria,	*Auburn*,	Philosophy
Patterson, Webster,	*Wilmington, Del.*,	Mech. Arts
Pearce, Otis Ezra,	*North Hannibal*,	Natural Hist.
Perkins, Albertus Delos,	*Little York*,	Arts
Pierce, George Henry,	*Branchport*,	Architecture
Raichle, Frank Godfrey,	*Buffalo*,	Electrical Engineering
Ransom, Charles Wellington,	*Ellenburg*,	Science and Letters
Rider, Ora Putnam,	*Parish*,	Philosophy
Riley, William Hermon,	*Wilmington, Del.*,	Mech. Arts
Romney, Joseph MacAuslin,	*Salt Lake City, Utah*,	Sc. & Let.
Russell, Isaac Howard,	*Castile*,	Philosophy
Rutledge, Arthur,	*Rockford, Ill.*,	Civil Engineering
Ryder, Stephen,	*Carmel*,	Elect. Engineering
Sackett, John Thomas,	*Brooklyn*,	Science and Letters
Sage, Adolphus Hiram,	*South New Berlin*,	Sci. and Let.
Schlesinger, Mark Mayer,	*New York City*,	Sc. and Letters
Seymour, John Pliny,	*Ogdensburg*,	Science and Letters
Shepard, Frank William,	*Medina, O.*,	Civil Engineering
Smith, Eva Anna,	*West Winfield*,	Sc. and Letters
Sprague, Danly Darius, Jr.,	*Holley*,	Civil Engineering
Stoner, Stanley,	*Griggsville, Ill.*,	Sc. and Letters
Story, Charles Butts,	*Schultzville*,	Science and Letters
Summers, Henry Elijah,	*Rochester*,	Natural History
Sweet, Joseph Ferris,	*Throop*,	Philosophy
Taylor, Hobart Chatfield,	*Chicago, Ill.*,	Sc. and Letters
Thurber, Charles Herbert,	*Deckertown, N. J.*,	Philosophy
Towl, Forrest Milton,	*Elmira*,	Optional
Tyler, Edward,	*Ithaca*,	Optional
Upton, Wallace Lincoln,	*Clymer*,	Electrical Engineering
Veiga, Saturnino Ferreira da, Jr.,	*Rio Janeiro, Brazil*,	Civil Eng.
Wheeler, Amos,	*Ithaca*,	Philosophy
White, Charles David,	*Marion*,	Natural History
Wightman, Edward Daniel,	*Eden*,	Mathematics

Wing, Charles Benjamin,	*Willow Brook*,	Civil Eng.
Wood, Phœbe Jane,	*Portville*,	Science and Letters
Yawger, John Francis,	*Union Springs*,	Science and Let.

SOPHOMORES.

Allendorf, Elbert James,	*Poughkeepsie*,	Philosophy
Alexander, Charles Doster,	*Prattville, Ala.*,	Optional
Alvord, Lucy,	*Johnstown*,	Arts
Aspinwall, John Judson,	*Troy, Pa.*,	Civil Engineering
Barton, Lyman Guy,	*Willsborough*,	Mechanic Arts
Bellinger, Lyle Fred,	*Ilion*,	Civil Engineering
Bennett, De Villo Levi,	*Wellington, Ohio*,	Elect. Eng.
Bishop, Robert Hallam,	*Trumbull's Corners*,	Philosophy
Bodine, Donaldson,	*Lodi*,	Optional
Boynton, Edward Carlisle, Jr.,	*Newburg*,	Mechanic Arts
Brill, Gerow Dodge,	*Poquog*,	Agriculture
Browning, Charles, Jr.,	*Chatham*,	Mechanic Arts
Brunk, Thomas Lafayette,	*Ottawa, Ill.*,	Agriculture
Burr, Lucius Franklin,	*St. Johnsville*,	Sc. and Letters
Byrne, Sarah,	*Edgewood, Ill.*,	Optional
Carr, Henry Low,	*Paterson, N. J.*,	Med. Prep.
Casey, George Whitman,	*Auburn*,	Architecture
Champion, Edward Willet,	*Goshen*,	Science and Letters
Chrisman, Francis Leon,	*Harrisburg, Pa.*,	Hist. & Pol. Sc.
Coar, Thomas Edward,	*New York City*,	Arts
Cohn, Morris, Jr.,	*Cobleskill*,	Science and Letters
Coley, Harrison,	*New Woodstock*,	Sc. and Letters
Colnon, Redmond Stephen,	*Potsdam*,	Civil Engineering
Coray, George Quincy,	*Provo City, Utah*,	Optional
Cornell, Ezra,	*Ithaca*,	Optional
Corser, Helen Henrietta,	*Minneapolis, Minn.*,	Optional
Covell, Grant,	*Springfield, Pa.*,	Mechanic Arts
Coville, Frederic Vernon,	*Oxford*,	Arts
Cox, James Lincoln,	*Norwich*,	Mechanic Arts

Curtis, Charles William,	*Washington, D. C.,*	Civil Eng.
Cutter, William Parker,	*Washington, D. C.,*	Anal. Chem.
Dennis, John Bartlett,	*Gardiner, Me.,*	Optional
Dimon, Henry Goldsmith,	*Riverhead,*	Civil Engineering
Doud, Eli Horace,	*Chicago, Ill.,*	Literature
Durand, Fred Coye,	*Westfield,*	Civil Engineering
Elliott, Elias Leavenworth,	*Glenora,*	Chemistry and Physics
Everitt, John Elmer,	*Burlington, Pa.,*	Medical Prep.
Fargusson, Mark,	*Brooklyn,*	Civil Engineering
Flint, Rufus,	*Rivas, Nicaragua,*	Mech. Arts
Franklin, Frank George,	*Plover, Wis.,*	Optional
Gerrish, William Blanchard,	*Oberlin, O.,*	Civil Engineering
Gifford, Arthur Warner,	*Little Utica,*	Architecture
Gillis, William Davis,	*Kinsman, Ohio,*	Mechanic Arts
Gilmore, Victor Lee,	*New Iberia, La.,*	Agriculture
Goodkind, Martin Henry,	*New York City,*	Optional
Greenawalt, William Eckert,	*Silver Spring, Pa.,*	Civil Eng.
Gray, Macomb Byron,	*Cape Vincent,*	Sc. and Letters
Gray, William Emory,	*Williamsport, Pa.,*	Mech. Arts
Gunner, Daniel Webster,	*Schaghticoke,*	Civil Engineering
Harrison, Joseph La Roy,	*North Adams, Mass.,*	Sc. and Let.
Hart, Emmet Ellsworth,	*Little Valley,*	Civil Engineering
Hays, Harry Thomas,	*Decatur, Ill.,*	Sc. and Letters
Hebard, Fred Whitmore,	*Woodville,*	History and Pol. Sci.
Hebbard, William Sterling,	*Rochester,*	Architecture
Hedden, Edward,	*Ithaca,*	Civil Engineering
Himes, Albert James,	*Oswego,*	Civil Engineering
Holman, Sidney Smith,	*Boston, Mass.,*	Mechanic Arts
Horr, Charles William,	*Wellington, Ohio,*	Sc. and Let.
Hungerford, Mary Gavina,	*Ithaca,*	Optional
Jaggard, Arthur Monroe,	*Altoona, Pa.,*	Optional
Jenkins, Ralph,	*Newburg,*	Medical Preparatory
Jones, Clinton Irving,	*Groton,*	Optional
Keating, Langford Spencer,	*Buffalo,*	Science and Letters
Kelsey, Sidney Eugene,	*Stockholm Depot,*	Civil Eng.
Kuykendall, Benjamin, Jr.,	*Towanda, Pa.,*	Optional
Laney, Lydia Hunt,	*Waterloo,*	Philosophy
Lawrence, Theodore Finch,	*Chester,*	Civil Engineering
Lemcke, John Frederick,	*Cedar Grove, N. J.,*	Med. Prep.

Lent, Albert Swift,	*Wellsboro, Pa.,*	Optional
Lockwood, William Augustus,	*Fairport,*	Agriculture
Lovell, Herbert Marlow,	*Ithaca,*	Optional
Maguire, Patrick James,	*Chateaugay,*	Civil Engineering
Marshall, George Montanye,	*Towanda, Pa.,*	Philosophy
Mattison, John Albert,	*Sand Bank,*	Science and Letters
McCargo, Grant,	*Pittsburgh, Pa.,*	Anal. Chem.
McCulloch, Robert Lawton,	*Stevens' Point, Wis.,*	Optional
Meehan, John William,	*Fairport,*	Civil Engineering
Meloy, Fredrika Williams,	*Portville,*	Optional
Miller, George Congdon,	*Elmira,*	Science and Letters
Moore, Frank Meredith,	*Syracuse,*	Hist. and Pol. Science
Moore, Veranus Alva,	*Parish,*	Science and Letters
Mulford, Augusta Louisa,	*East Orange, N. J.,*	Nat. History
Nettleton, James Burritt,	*Medina, Ohio,*	Architecture
Newton, Frank Merrick,	*Homer,*	Optional
Norton, Albert Julius,	*Utica,*	Architecture
Norton, George Harvey,	*East Pembroke,*	Civil Eng.
Olmstead, Edward,	*Waverly,*	Medical Preparatory
Otis, Lois Macy,	*Sherwood,*	Science and Letters
Oviatt, Bordman Lambert,	*Shushan,*	Medical Preparatory
Oviatt, David Brainerd,	*Shushan,*	Mechanic Arts
Perkins, Ella Gertrude,	*Addison Hill,*	Optional
Potter, Grant,	*Ithaca,*	Mechanic Arts
Proctor, Alfred Stainbank,	*Denver, Col.,*	Civil Engineering
Richards, George Blackwell,	*Leavenworth, Kansas,*	Sc. & Let.
Roberts, Perry Buchanan,	*Ithaca,*	Hist. and Pol. Science
Runner, Emma Avaline,	*Ithaca,*	Science and Letters
Russell, James Earl,	*Hamden,*	Arts
Rutherford, Robert Elmer,	*Binghamton,*	Optional
Ryan, Harris Joseph,	*Halifax, Pa.,*	Electrical Eng.
Ryther, George De Groot,	*Carthage,*	Mechanic Arts
Saal, George Frederick,	*Cleveland, Ohio,*	Optional
St. John, Richard Collier,	*St. Catharine's, Canada,*	Civil Eng.
Sargent, Erle Hoxsie,	*Medina, Ohio,*	Optional
Selmser, Kate Eveline,	*Waterloo,*	Literature
Sheldon, Morris Woodworth,	*Hornellsville,*	Chem. and Physics
Smith, Edward Leroy,	*Binghamton,*	Science and Let.
Smith, Harry Ezra,	*Pike,*	Mechanic Arts

Smith, Milton,	*Ellenville*,	Optional
Smith, Wayland Hyatt,	*Philadelphia*, *Pa.*,	His. & Pol.Sc.
Stanbrough, Lyman Truman,	*Owego*,	Science and Letters
Stedman, John Moore,	*Brockport*,	Natural History
Sterling, Guy,	*Gambier*, *O.*,	Civil Engineering
Stewart, Neil, Jr.,	*York*,	Civil Engineering
Stone, Frank Elmer,	*Livonia*,	Civil Engineering
Sweet, Robert Vaughn,	*Throop*,	Medical Preparatory
Taylor, John Waring,	*Corinth*, *Miss.*,	Sc. and Letters
Thomson, Fred William,	*Alexandria Bay*,	His. & Pol. Sc.
Thomson, John Fuller,	*Alexandria Bay*,	Sc. and Let.
Tomlinson, Thomas Wilbur,	*Logansport*, *Ind.*,	Optional
Turnbull, Thomas, Jr.,	*Syracuse*,	Medical Preparatory
Vedder, Herman Klock,	*St. Johnsville*,	Civil Engineering
Warner, Albert Rollin,	*Wellington*, *Ohio*,	Sc. and Let.
Weber, George Frederick,	*Lysander*,	Science and Letters
Wheeler, Fred Russell,	*Buffalo*,	Hist. and Pol. Science
Wheeler, Metellus Clinton Woodbury,	*Peoria*, *Ill.*,	Mechanic Arts
White, Horace,	*Syracuse*,	Science and Letters
Wilbur, Royal Edwards,	*Carthage*,	Hist. and Pol. Science
Wilkinson, Theodore Kirkland,	*Syracuse*,	Philosophy
Willard, Frederick Bush,	*Geneseo*,	Optional
Williams, Chauncey Grant,	*Ithaca*,	Civil Engineering
Williams, Otis Lincoln,	*Ithaca*,	Electrical Engineering
Wilson, James Fountain,	*Menomonee*, *Wis.*,	His. & Pol. Sc.
Wright, Ellsworth David,	*Ithaca*,	Arts

FRESHMEN.

Aldrich, Byron Seymour,	*Port Byron*,	Optional
Allen, Lucian Crandall,	*Whitesville*,	Civil Engineering
Antisdale, George Perez,	*Nyack*,	Natural History
Barnes, Edward Bradford,	*Corning*,	Science and Letters
Barnum, Merritt Wright,	*Chappaqua*,	Natural History
Barros, Bento de,	*S. Paulo, Brazil*,	Agriculture
Battin, John Wilson,	*Albany*,	Philosophy
Beardsley, Jessie May,	*Ithaca*,	Architecture
Beardsley, Lewis Aurelius,	*Ithaca*,	History and Pol. Science
Beauchamp, Howard Carter,	*Baldwinsville*,	Science and Let.
Becker, Charton Lansing,	*Philadelphia*,	Civil Engineering
Benson, Orville,	*Sharon, Ct.*,	Civil Engineering
Berrigan, William Joseph,	*Sandy Hill*,	Science and Letters
Best, Lyman Austin,	*Hornellsville*,	Civil Engineering
Bissell, George Welton,	*Poughkeepsie*,	Mechanic Arts
Blood, Bryant Harmon,	*Ludlow, Pa.*,	Elect. Engineering
Blood, Charles Hazen,	*Ithaca*,	Philosophy
Bostwick, William Herbert,	*Ithaca*,	Science and Letters
Boult, Ella Maud,	*Medina, O.*,	Optional
Brace, James Frederick,	*Leavenworth, Kansas*,	Optional
Brasser, Jacob,	*East Williamson*,	Optional
Briesen, Julius von, Jr.,	*New York City*,	Civil Eng.
Bristol, Carrie Louise,	*West Sand Lake*,	Sc. and Let.
Broadwell, Frank Adoniram,	*Morrisonville*,	Civil Engineering
Bronson, Hiram Sherman,	*Marquette, Mich.*,	Civil Eng.
Brooks, Harry Niemeyer,	*Brooklyn*,	Mechanic Arts
Brown, Pierre Marshall,	*Hempstead*,	Civil Engineering
Brunn, Adeline Eve,	*Buffalo*,	Optional
Burnett, Archie Collamer,	*Waterloo*,	Optional
Carpenter, Charles Edwin,	*Big Flats*,	Science and Letters
Case, Josiah Corwin,	*Peconie*,	Electrical Engineering
Chamberlain, Joseph Redington,	*Kanona*,	Science and Letters
Clancy, John Scott,	*Hornellsville*,	Civil Engineering
Clark, Harry Willard,	*N. Andover, Mass.*,	Anal. Chem.
Clock, Fred Leland,	*Ithaca*,	Civil Engineering
Cole, Byron Gray,	*Ithaca*,	Medical Preparatory
Coles, Howard Lawrence,	*New Rochelle*,	Sc. and Letters

Colt, Bertha Napier,	*Medina, O.,*	Optional
Cooling, William Lowrey,	*Wilmington, Del.,*	Civil Eng.
Cooper, William,	*Evans' Mills,*	Mechanic Arts
Cornell, Arthur Leland,	*Albany,*	Optional
Crossman, George Seth,	*Brushton,*	Agriculture
Crossman, Stephen Henry,	*Brushton,*	Agriculture
Crittenden, Fred King,	*Ithaca,*	Civil Engineering
Daugherty, Lawrence Lumaree,	*Wabash, Ind.,*	Optional
Day, James Hallack, Jr.,	*Saybrook, Ct.,*	Optional
Dibble, Arthur Jackson,	*Franklin,*	Optional
Dickinson, Mellville Day,	*Seward,*	Science and Letters
Dillenbeck, Clark,	*Palatine Bridge,*	Civil Eng.
Disney, Irvin Porter,	*Baltimore, Md.,*	Electrical Eng.
Dix, Charles Billinger,	*Glens Falls,*	Mechanic Arts
Dolson, Edward,	*Bath,*	Science and Letters
Donaldson, George,	*Gilbertsville,*	Optional
Driscoll, William Maurice,	*Ithaca,*	Mechanic Arts
Duffies, Edward John,	*Markeson, Wis.,*	Civil Eng.
Earll, Lottie Irene,	*Syracuse,*	Arts
Edgerton, Charles Rollin,	*Little Rock, Ark.,*	Architecture
Edwards, James Harvey,	*Oxford,*	Civil Engineering
Emmons, Charles Morton,	*Huron,*	Civil Engineering
Epps, Orlo,	*Oneonta,*	Optional
Farling, Montgomery,	*Ithaca,*	Agriculture
Farrington, William Sherman,	*Jacksonville,*	Civil Engineering
Fisher, Henry Wright,	*Dymond City, N. C.,*	Elect. Eng.
Fisher, John Arthur,	*Ithaca,*	Science and Letters
Fisher, William Clark,	*Westerlo,*	Arts
Fitch, Winchester,	*Jefferson, O.,*	Sc. and Letters
Foster, Lottie,	*Ithaca,*	Literature
Fowler, Charles Sumner,	*Gouverneur,*	Arts
France, Gertrude Gladys,	*Skaneateles,*	Arts
Fukuzawa, Ichitaro,	*Tokio, Japan,*	Agriculture
Fulkerson, Joseph Chapman,	*Dryden,*	Mechanic Arts
Gaar, Jonas,	*Richmond, Ind.,*	Civil Eng.
Gans, John Lyons,	*Morris Cross Roads, Pa.,*	Civil Eng.
Gibson, George Harry,	*Peoria, Ill.,*	Analytical Chem.
Gilman, Frank Gaylord,	*Sherburne,*	Literature
Glasser, Charles Harry,	*Mineville,*	Mechanic Arts

Gleason, Kate,	*Rochester*,	Mechanic Arts
Glover, John Irving,	*New Orleans, La.*,	Architecture
Goetter, Leon Joseph,	*Montgomery, Ala.*,	Sc. and Let.
Green, Charles Newton,	*Batavia*,	Civil Engineering
Groves, Albert Bartleton,	*Rome*,	Architecture
Hall, Fanny Sarah Crossett,	*Ithaca*,	Medical Preparatory
Hall, Halliette Deraxa Ellis,	*Ithaca*,	Optional
Hall, Lorenzo Thomas,	*Wyanett, Ill.*,	Civil Engineering
Hamant, Irving,	*Groutville, Ct.*,	Medical Prep.
Hampton, Willis Herbert,	*Dansville*,	Electrical Eng.
Harris, William Mason,	*Owego*,	Optional
Hasbrouck, Alvah Deyo,	*Highlands*,	Civil Engineering
Heath, Henry Edward,	*Thomaston, Ct.*,	Mechanic Arts
Hegewald, Arthur Frederick,	*New Albany, Ind.*,	Mech. Arts
Heller, David Neish,	*Elmira*,	Science and Letters
Heller, Michel Burt,	*Elmira*,	Science and Letters
Henderson, Eliot Middleton,	*Washington, D. C.*,	Mech. Arts
Hersey, Theodore,	*Montreal, Canada*,	Mech. Arts
Higgins, George Edwin,	*Memphis*,	Civil Engineering
Hopkins, Jesse James,	*Churchville*,	Mechanic Arts
Hough, Abraham Lincoln,	*Lowville*,	Science and Letters
Houghton, Collins,	*Carthage*,	Civil Engineering
Howes, James Thomas,	*Utica*,	Arts
Hoyt, George Frederick Gladding,	*Brooklyn*,	Civil Engineering
Hull, Mary Josephine,	*Ithaca*,	Philosophy
Hyatt, John Sherwood,	*Troy*,	Civil Engineering
Ickelheimer, Henry Rubens,	*New York City*,	Sc. and Letters
Johnson, George Augustus,	*Youngstown, O.*,	Mechanic Arts
Johnson, Harry George,	*Elmira*,	Civil Engineering
Jones, Forest Robert,	*Sharon, O.*,	Mechanic Arts
Jones, Julio,	*Sacour, U. S. Col.*,	Civil Eng.
Jones, Sebastian Chatham,	*Aurora*,	Elect. Engineering
Kammann, Will Theodore,	*Dubuque, Iowa*,	Elect. Eng.
Kennedy, Frank Gallop,	*Oneida*,	Chem. and Physics
King, Stephen Trowbridge,	*Chicago, Ill.*,	Optional
King, Warren Phelps,	*Ithaca*,	Architecture
Kinkaid, Charles Flint,	*Eureka Springs, Ark.*,	Elect. Eng.
Kuhns, Aaron Henry,	*Greensburg, Pa.*,	Civil Eng.
Lathrop, Henry Burrowes,	*Walla Walla, W. T.*,	Arts

Leonard, James Augustus,	*Newburg*,	Architecture
Lewis, Fred Nelson,	*Herkimer*,	Optional
Linen, George Griffith,	*Buffalo*,	Mechanic Arts
Lorber, Frederic Auguste,	*Ithaca*,	Science and Letters
Lord, Frank Stone,	*Mendon*,	Optional
Loomis, Clarence Edward,	*Oneida*,	Electrical Engineering
Lougee, Mary Williamina,	*West Roxbury, Mass.*,	Sc. & Let.
Lowman, Ulysses Mercur,	*Wellsburg*,	Science and Letters
Ludwig, John Lawrence,	*Richmond, Va.*,	Mechanic Arts
Lynde, Arthur Lincoln,	*Antwerp*,	Agriculture
Macomber, Irwin John,	*Watertown*,	Electrical Eng.
McAllister, Charles Albert,	*City Island*,	Mechanic Arts
Marx, Stephanie,	*Toledo, O.*,	Science and Letters
Maxwell, William Sampson,	*Brooklyn*,	Civil Engineering
Mead, Winslow Morrison,	*Richmond, O.*,	Optional
Menocal, Adolfo Joseph,	*Havana, Cuba*,	Civil Eng.
Menocal, Mario Garcia,	*Havana, Cuba*,	Civil Eng.
Metzger, Albert Elbracht,	*Indianapolis, Ind.*,	Sc. and Let.
Millard, John Roosa,	*Kingston*,	Mechanic Arts
Miller, Ransford Stevens, Jr.,	*Ithaca*,	Arts
Miller, Theodore,	*Antwerp*,	Hist. and Pol. Science
Molitor, Frederic Albert,	*New York City*,	Civil Eng.
Mosscrop, William Addams,	*Brooklyn*,	Electrical Eng.
Munger, George Grover,	*Ithaca*,	Arts
Nathan, Alfred,	*New York City*,	Mechanic Arts
Neale, Charles Thompson, Jr.,	*Pittsburg, Pa.*,	Optional
Newberry, Robert Thorne,	*New York City*,	Architecture
Noyes, Walter Chadwick,	*Lyme Ct.*,	Optional
Nye, Algernon Sidney,	*Watkins*,	Civil Engineering
O'Toole, James,	*Waterville*,	Science and Letters
Page, Erford Lydell,	*Whitney's Point*,	Elect. Eng.
Page, Murray Esek,	*Bath*,	Mechanic Arts
Parmeter, George Cox,	*Hammond*,	Architecture
Parshall, Horace Field,	*Milford*,	Electrical Engineering
Parshall, William Worthington,	*Uniontown, Pa.*,	Optional
Pearson, Leonard,	*Ithaca*,	Agriculture
Pelton, Gilbert Brace,	*Ilion*,	Optional
Pfau, William Henry,	*Hamilton, O.*,	Architecture
Phillips, Albert,	*Newark, N. J.*,	Optional

Pickard, Jay Eugene,	*Fort Plain,*	Optional
Pitcher, Fred Byron,	*Adams,*	Civil Engineering
Potter, Edwin Stanton,	*Wellsboro, Pa.,*	Sc. and Letters
Preston, George Benton,	*Corning,*	Mechanic Arts
Psotta, Charles Ludwig George,	*Philadelphia, Pa.,*	Elect. Eng.
Psotta, Louis Frederic,	*Philadelphia, Pa.,*	Elect. Eng.
Puterbaugh, Walter Leslie,	*Peoria, Ill.,*	Mechanic Arts
Puyana, Manuel Maria,	*Bucaramanega, U. S. C.,*	Agri.
Quincey, George Adams,	*Pittsburg, Pa.,*	Electrical Eng.
Randall, Norman Benjamin,	*Stockport,*	Mechanic Arts
Read, Willette Warren,	*Watertown,*	Civil Engineering
Roess, Henry Christian,	*South Oil City, Pa.,*	Hist. & Pol. Sc.
Rogers, Agnes Adelaide,	*Rochester,*	Science and Letters
Romer, William Johnstone,	*Ithaca,*	Hist. and Pol. Science
Rowlee, Willard Winfield,	*Fulton,*	Science and Letters
Ruyter, George Arlin,	*North Grosvenor, Ct.,*	Optional
Sanford, Esther Marion,	*Marion,*	Arts
Sanford, John Wheeler,	*Warwick,*	Agriculture
Sawyer, William Herbert,	*Watertown,*	Civil Engineering
Scaife, James Verner,	*Alleghany City, Pa.,*	Science
Schreiner, John Charles, Jr.,	*Alleghany City, Pa.,*	Arch.
Schwalbach, Frank,	*Menosha, Wis.,*	Civil Eng.
Scott, Jacob Charles Edward,	*Albany,*	Philosophy
Scribner, Erwin Earnest Eliphalet,	*Scriba,*	Science and Letters
Shannon, Thomas,	*Bath,*	Science and Letters
Shattuck, George Henry, Jr.,	*Medina,*	Architecture
Sheldon, LeRoy Gray,	*Gouverneur,*	Agriculture
Shepard, Fred Harry,	*Clyde,*	Optional
Silliman, Joseph Warren,	*Ashtabula, O.,*	Optional
Simpson, Peter Brennan,	*Newport, R. I.,*	Optional
Sisco, Louis,	*Baldwinsville,*	Civil Eng.
Smith, Adeltus Ervin,	*Manchester Centre,*	Optional
Snow, Julia Warner,	*La Salle, Ill.,*	Science
Soulé, Albert Lee,	*New Orleans, La.,*	Sc. and Let.
Soulé, Edward Everett,	*New Orleans, La.,*	Sc. and Let.
Spencer, Andrew,	*Milford,*	Science and Letters
Springer, Philip Güttingen,	*Columbus, Ga.,*	Mechanic Arts
Squier, Wallace Carlton,	*Stanley,*	Optional
Stanbrough, Frank Truman,	*Owego,*	Optional

Staunton, Frederick Marshall,	*Charleston, W. Va.,*	Civil Eng.
Steele, Samuel Weirner,	*Greensburg, Pa.,*	Sc. and Let.
Stephens, George Washington,	*Tarrytown,*	Mechanic Arts
Sternberger, Edwin,	*New York City,*	Sc. and Let.
Stockbridge, William Morse,	*Washington, D. C.,*	Science
Stone, Walter Hitchcock,	*Sandusky, O.,*	Science and Let.
Stratton, William Buck,	*Elmira,*	Architecture
Stratton, William Henry,	*Circleville, O.,*	Civil Engineering
Strong, Susan Caroline,	*Owego,*	Arts
Stuart, Charles Willetts,	*Skaneateles,*	Science and Let.
Sullivan, John,	*Fisher's,*	Civil Engineering
Tansey, George Judd,	*St. Louis, Mo.,*	Optional
Taylor, Harry Leonard,	*Ithaca,*	Arts
Taylor, John Myers,	*Albany,*	Civil Engineering
Thorn, Seward Thomas,	*Clyde,*	Science and Letters
Titus, George Herbert,	*Harpersfield,*	Arts
Treat, Harry Whitney,	*Monroe, Wis.,*	Optional
Tuthill, Victor Maxwell,	*Dowagiac, Mich.,*	Philosophy
Tuttle, Edwin Johns,	*Wellsboro, Pa.,*	Civil Eng.
Twining, William Stanton,	*Union City, Pa.,*	Mech. Arts
Ulrich, Russell,	*Hyde Park, Ill.,*	Civil Eng.
Van Valkenburg, Edwin Augustus,	*Wellsboro, Pa.,*	Sc. and Let.
Vedder, Wellington Romeyn,	*Leeds,*	Civil Engineering
Wallenbeck, Edward Thomas,	*Willow Creek,*	Mech. Arts
Walter, Arthur Leslie,	*Whitney's Point,*	Mech. Arts
Walton, William Hickman.	*Buffalo,*	Mechanic Arts
Wardwell, Mary Margaretta,	*Buffalo,*	Architecture
Webster, Milo Freeman,	*Victor,*	Natural History
Weeks, George Rufus,	*Clyde,*	Optional
White, Andrew Strong,	*Syracuse,*	Science and Letters
White, George Reeves,	*Southampton,*	Sc. and Letters
Widman, Mary Anna,	*Freeport, Ill.,*	Philosophy
Wilder, Kitty Mary,	*Medina,*	Optional
Williams, William,	*Groton,*	Civil Engineering
Wilson, Benjamin Lee,	*Newark, O.,*	Optional
Winters, Charles Sylvester,	*Binghamton,*	Arts
Wixom, Fred Charles,	*Starkey,*	Optional
Woolner, Samuel,	*Peoria, Ill.,*	Anal. Chemistry
Wyckoff, Richard Tuttle,	*Perry,*	Science

SPECIAL STUDENTS.

(See page 45.)

Arnoldt, Julius William,	*Rochester*,	Architecture
Bausch, Henry,	*Rochester*,	Mechanic Arts
Bruce, Edward Malcolm,	*Aurora, Ill.*,	Chem. and Physics
Cable, Frank,	*Cleveland, O.*,	Mechanic Arts
Coffin, Lawrence,	*Nantucket, Mass.*,	Phys. & Chem.
Cooper, Walden Harte,	*Titusville, Pa.*,	Mechanic Arts
Eldredge, Alfred Henry,	*Watertown*,	Mechanic Arts
Flynn, Henry,	*Leavenworth, Kan.*,	Mech. Arts
Gregor, Frances,	*Ahnapee, Wis.*,	Literature
Hart, John Battelle,	*Clarksburg, W. Va.*,	Mech. Arts
Hippely, Edward,	*Erie, Pa.*,	Mechanic Arts
Howe, John Baker,	*Ithaca*,	Chemistry
Jones, Maurice Frederick,	*Sterlington*,	Analytical Chem.
King, Herman Clark,	*Willow Creek*,	Agriculture
Maddocks, William,	*Stafford, England*,	Mech. Arts
Quin, Thomas Francis,	*Buffalo*,	Mechanic Arts
Sanford, Edward Burt,	*Warwick*,	Agriculture
Siemens, George Mellin,	*St. Joseph, Mo.*,	Architecture
Simpson, Harold Granger,	*Columbus, O.*,	Hist. & Pol. Sci.
Tenny, Henry Allen,	*Worcester, Mass.*,	Hist. & Pol. Sc.
Vick, Henry,	*Rochester*,	Mechanic Arts

SUMMARY OF RESIDENT STUDENTS.

RESIDENT GRADUATES, including FELLOWS,		29
Seniors,	59	
Juniors,	89	
Sophomores,	133	
Freshmen,	232	
Special Students,	21	
Total Undergraduates,		534
Total in the University,		563

SUMMARY OF GRADUATES SINCE THE UNIVERSITY OPENED, OCTOBER, 1868.

BACHELORS—Arts,	146
Literature,	45
Philosophy,	73
in History and Political Science,	8
Science, before the division of the course,	187
Science and Letters, since the division,	169
Chemistry and Physics,	18
Natural History,	24
Physical Science,	8
Mathematics,	4
Civil Engineering,	2
Agriculture,	28
Architecture,	37
Civil Engineering,	152
Mechanical Engineering,	54
Veterinary Science,	3
Total, (deducting seven for having taken two degrees, 1 A. B.; 1 Ph. B.; 1 Agr. B.; 2 Arch. B.; and 2 B. C. E.),	958

Second Degrees—	Masters of Science,	19
	Masters of Arts,	13
	Doctors of Philosophy,	6
	Civil Engineers,	20
	Architects,	1
	Mechanical Engineers,	1
	Doctor of Veterinary Medicine,	1
Licentiate Certificates,		19
Certificates of Proficiency,		7

ADMISSION AND CLASSIFICATION.

CONDITIONS OF ADMISSION.

Candidates must be of good moral character and at least *sixteen* years of age, or, if women, *seventeen.*

Candidates for admission must obtain permits for examination at the Registrar's office, and the results of the examinations may be ascertained from the Registrar.

ENTRANCE EXAMINATIONS.

Examinations in all the subjects required for admission to the University are held *three* times in the year, as follows: 1. In June, at the end of the Spring term, Monday, Tuesday and Wednesday preceding Commencement Day. 2. In September, at the beginning of the Fall term. 3. In January, at the beginning of the Winter term. The days will be found indicated in the Calendar. Special examinations of candidates for admission can be held at other times only by permission of the Faculty.

I. The Primary or English Entrance Examinations.

All candidates for admission, except those provided with certificates or diplomas as specified below, are examined as follows:

1. In *English Grammar;* Whitney's Essentials of English Grammar is the standard. A short composition is required as a test of the candidate's knowledge of spelling, punctuation, the use of capitals, and elementary English construction.

If the candidate prefers, the subject for this composition will be assigned by the examiner from one of the books named below, and the knowledge of the subject matter shown will be duly regarded.

In 1885: Shakespeare's Merchant of Venice, Scott's Lady of the Lake, Hawthorne's Twice-Told Tales, Lowell's Vision of Sir Launfal.

2. In *Geography,* political and physical; as much as is contained in Harper's School Geography, or in Warren's Common chool Geography.

3. In *Physiology;* as presented in the smaller text-books upon the subject, exclusive of the nervous system and the names of bones and muscles.

4. In *Arithmetic*, including the metric system of weights and measures; as much as is contained in the larger text-books.

5. In *Plane Geometry;* as much as is contained in the first five books of Chauvenet's Treatise on Elementary Geometry, or in the first five books of Wentworth's Elements of Plane and Solid Geometry, or in the first six books of Newcomb's Elements of Geometry, or in the first six books of Hamblin Smith's Elements of Geometry.

6. In *Algebra*, through quadratic equations, and including radicals and the theory of exponents; as much as is contained in the first fourteen chapters of Loomis' Treatise on Algebra, or in Olney's Elementary Course in Algebra, or in the first five sections of Robinson's University Algebra, or in the first twenty-six chapters of Hamblin Smith's Elementary Algebra.

In Arithmetic, and in the fundamental operations of Algebra, such as multiplication and division, the management of brackets, the solving of numerical and literal equations of the first and second degrees, the combining and simplifying of fractions and radicals, the interpretation and use of negative quantities and of 0 and ∞, the putting of problems into equations—the student should have distinct notions of the meaning and the reason of all that he does, and be able to state them clearly in his own language; he should also be able to perform all these operations, even when somewhat complex, with rapidity, accuracy, and neatness; and to solve practical problems readily and completely. In his preparatory study he is advised to solve a great many problems, and to state and explain the reasons for the steps taken. In Geometry he should learn the definitions accurately, whether in the language of the text-book or not, and in proving a theorem or solving a problem he should be able to prove every statement made, and to go back step by step till he rests upon the primary definitions and axioms. He should be able to apply the principles of geometry to practical and numerical examples, to construct his diagrams readily with rule and compass, and to find for himself the solutions of simple problems and the demonstrations of simple theorems. Besides oral recitation, he is advised to write out his demonstrations, having equal regard to the matter and to the form of his statements; and when written he

may carefully study them to make sure, first, that he has a complete chain of argument, and, secondly, that it is so arranged that without defect or redundance one step follows as a logical consequence of another.

These examinations are held in the following order:

First Day.—9 A. M., Arithmetic; 11 A. M., Geography; 3 P. M., English Grammar.

Second Day.—9 A. M., Plane Geometry; 11.30 A. M., Physiology; 2.30 P. M., Algebra through Quadratics.

In place of these examinations certain certificates or diplomas are received as follows:

1. *Certificates* issued by the *Regents of the University* of the State of New York are accepted in place of the examinations in English Grammar, Geography, and Arithmetic.

2. *Certificates* issued by the *Superintendent of Public Instruction* of the State of New York, and *Diplomas* issued by the State normal schools, and by those academies and high schools of the State of New York whose requirements for graduation have been approved by the Faculty, and whose course of study requires Physiology and Plane Geometry, are accepted in place of the examinations in all the subjects named above *except Algebra.*

3. *Diplomas* issued by the *Regents* to graduates from the high schools and academies of the State of New York are accepted in place of the examinations in all the subjects named above.

Optional students are admitted to the University upon passing the English Entrance or Primary Examinations; and for admission to the courses in *Agriculture*, *Architecture*, *Civil Engineering*, *Electrical Engineering*, and *Mechanic Arts*, only these Primary Examinations are required.

II. EXAMINATIONS FOR ADMISSION TO THE OTHER COURSES.

For admission to any other of the regular courses of study examinations, *in addition to the Primary or English Entrance Examinations*, are required, as follows:

To the Courses in Science, Science and Letters, Mathematics, Chemistry and Physics, and Analytical Chemistry:

In addition to the English Entrance, an examination in *any one* of the following subjects:

1. In *French*, the principles of French Grammar, the translation of French at sight, the translation of English into French, and the equivalent of two of Bôcher's modern French plays and Lacombe's Petite Histoire du Peuple Français;

2. In *German*, the whole of Whitney's German Grammar, the translation of German at sight, the translation of English into German, and one hundred pages of Whitney's Reader, including two of the longer prose extracts or an equivalent;

Any deficiency in the preparatory French or German may be made up, as extra work, by reciting with the regular classes in the University.

Or the student may offer in *Mathematics*, Solid Geometry and Conic Sections, as much as is contained in Newcomb's Elements of Geometry; Advanced Algebra, as much as is contained in Olney's University Algebra, or in Newcomb's Algebra; and Trigonometry, Plane and Spherical, as much as is contained in Wheeler's Elements of Trigonometry, or in the unstarred portions of Oliver Wait and Jones' Treatise on Trigonometry.

To the Course in Natural History:

In addition to the Primary Examinations, as follows: 1. In *French* or *German*, as above. 2. In *Plane Trigonometry*. 3. In *Latin*, four books of Cæsar's Commentaries or an equivalent, with a good knowledge of the grammar. 4. In *Greek*, the alphabet and enough of the language to enable the student to recognize, analyze, and form scientific technical terms.

To the Two-Year Course Preparatory to the Study of Medicine:

In addition to the Primary Examinations, as follows: 1. In *Plane Trigonometry*, as above. 2. In *Latin*, as above. 3. In *Greek*, as above.

To the Courses in Literature, Philosophy, and History and Political Science:

In addition to the Primary or English Entrance Examinations, as follows: 1. In *French* or *German*, or *Mathematics*, as above. 2. In *Latin*, as below. 3. In *Grecian* and *Roman History* as below.

To the Course in Arts:

In addition to the Primary or English Entrance Examinations, as follows:

1. In *Greek*, candidates are expected to have read at least one hundred pages of Attic prose, and three books of Homer: they are examined (1) critically on what they have read; (2) in translating easy Greek at sight; and (3) in translating English into Greek.

2. In *Latin*, candidates are examined (1) in the following authors, with questions on subject-matter, constructions, and the formation and inflection of words: Cæsar, four books of the Gallic war, Virgil, the Eclogues and six books of the Æneid, with the prosody, Cicero, six Orations, including the four against Catiline; (2) in the translation at sight of passages of average difficulty from Cæsar and Cicero; and (3) in the translation into Latin of a piece of connected English based upon the principles and vocabulary contained in the first forty lessons of Allen's Introduction to Latin Composition.

3. In *Grecian* and *Roman History*, and the outlines of ancient geography; Fyffe's Primer of Greece, Creighton's Primer of Rome, and Tozer's Primer of Classical Geography will indicate the amount and method of study desired.

These additional examinations are held on the *third day*, as follows:

Third Day—8 A. M., Solid Geometry; 8 A. M., French; 9 A. M., Greek; 10.30 A. M., German; 10.30 A. M., Advanced Algebra; 2.30 P. M., Latin; 2.30 P. M., Trigonometry.

The examination in Grecian and Roman History is held at 8 A. M. on the *second day* of the examinations.

ADMISSION WITHOUT EXAMINATION.

Any person at least twenty-one years of age, and having satisfactory attainments, may be admitted by vote of the Faculty, without examination, *as a Special Student*, on the recommendation of the professor in charge of any department in which he is to take a large part of his work. Such students cannot be candidates for a degree or a licentiate certificate; and their admission must be renewed every year.

CANDIDATES FROM OTHER COLLEGES.

Certificates of honorable dismissal from other colleges are received in place of the *Primary Examinations*, when offered by candidates who *have passed at least one term's examinations* at the institution granting such dismissal. The dismissal does not admit the student to any special standing in the University, nor does it entitle him to enter upon advanced work in any study or department, without such examination as the professor in charge may think it necessary to give him.

ASSIGNMENT TO CLASSES.

Every student who intends to complete any one of the four-year courses and graduate is assigned, on his admission to the University, to some one of the four annual classes; and no student will be allowed to pass from one to another of these classes until the work of the preceding year has been satisfactorily done.

Students who do not intend to complete any one of the four-year courses and graduate, are registered as "optional" in one of the four annual classes; but any student who has been registered as optional will be permitted to register in any one of the regular courses, on his completion of the work required for the standing which he proposes to take in that course.

ADMISSION TO ADVANCED STANDING.

Any student who has had in another college, or elsewhere, an equivalent to one or more of the years of any of the regular courses may, on presenting evidence satisfactory to the Faculty of his ability to go on with the class he proposes to enter, be admitted provisionally to an advanced standing in that course, at his admission to the University. See page 49, "Graduation."

ADMISSION TO RESIDENT GRADUATE STUDY.

Students are admitted to graduate study after having taken a baccalaureate degree in the University, or on presenting the diploma of an equivalent degree conferred elsewhere; they are at liberty to attend lectures, recitations, or other exercises of undergraduates, and to use the library, museums, etc. They are expected to pursue some study of advanced character under the direction of a professor or of a special faculty.

RESIDENCE AND GRADUATION.

TERMS AND VACATIONS.

The academic year is divided into three terms, and there are three vacations.

Commencement comes on the third Thursday in June.

The Fall Term begins on the Tuesday following the thirteenth day of September, and ends on the Friday after the sixteenth day of December, making a term of thirteen weeks and four days.

The Winter Term begins on the Tuesday next after the second day of January; except when, in leap year, that Tuesday would be the third day of January, in which case it will begin on the Tuesday after the third.

The Spring vacation extends from the noon of the Friday next after the twenty-third of March until the second Saturday following.

The Spring Term begins on the second Saturday after the close of the Winter Term; the instruction begins on the Monday following, and continues until Commencement; making in all thirty-six weeks of term-time in the academic year.

The beginning and ending of terms and vacations of each year, and other matters of detail relating to them, may be found in the Calendar.

REGISTRATION EACH TERM.

At the beginning of every term each student must obtain a Certificate of Registration before joining any class or attending any lectures; and no student, after having once been admitted to the University, will be allowed to register after the close of Registration Day, except on recommendation of the Committee on Absences, or by special permission of the Faculty.

EXERCISES OF THE TERM.

A printed schedule of the University exercises is issued each term. Every student must take the equivalent of at least fifteen

hours of recitations a week, exclusive of military science and drill. Two and a half hours of laboratory work, or three hours of drafting or shop-work, are regarded as the equivalent of one recitation.

The regular examinations in all studies are held at the end of each term. Failure at examination entails forfeiture of position iu the class, or exclusion from the course, or, in some cases, from the University. The *Course Book* affords the student an opportunity of preserving a record of his examinations.

PAYMENTS TO THE UNIVERSITY.

The fee for tuition is $25 a term, payable within ten days after registration.

Tuition is free to *State students*, to *resident graduates*, and to students pursuing the prescribed course in *Agriculture*, and *intending to complete* that course.

Every person taking laboratory work in chemistry, physics, zoölogy, or entomology, must deposit with the Treasurer security for the materials to be used in the laboratory. Students residing in the University buildings must pay their room-bills one term in advance. All the members of the University are held responsible for any injury done by them to its property.

EXPENSES OF RESIDENCE.

The following is a fair estimate of the yearly expenses:

Tuition, $25 a term, - - - - - -	$ 75.00
Room, board, lights, fuel, and laundry, about - -	200.00
Text-books, etc., about - - - - - - - -	25.00
Total, - - - - - -	$300.00

The cost for board, rent of furnished room, fuel, and lights at the Sage College, which is exclusively for lady students, varies from $5 to $6.50 a week. A student occupying alone one of the best rooms pays $6.50 a week. If two occupy such a room together, the price is $5.75. Those occupying less desirable rooms, with two in a room, pay $5 a week each. The entire building is warmed by steam, and, in most cases, the sleeping apartment is separate from the study.

The expense of living in Ithaca varies, for board, room, fuel, and lights, from $4 to $7 a week. By the formation of clubs, students may reduce their expenses to $3.50 or $2.50 a week for board.

GRADUATION.

All the courses leading to a degree require four years for their completion.

Any student who has been admitted to an advanced standing provisionally on his admission to the University, must pass the examinations required for that standing at the first opportunity after his admission. Or, after having been in the University for a year or more, and having sustained a good character, maintained a high standing in his classes, and approved himself for scholarship, the student may, by a vote of the Faculty, be admitted to some definite standing, such as his scholarship will entitle him to—the Faculty by this act accepting his studies elsewhere as equivalent to what he would have done here, if he had entered the University at the beginning of his collegiate course.

I. THE DEGREE OF BACHELOR.

The degrees of Bachelor of Arts, of Literature, of Philosophy, of Agriculture, of Architecture, of Civil Engineering, and of Mechanical Engineering are conferred after the satisfactory completion of the corresponding courses. The degree of Bachelor of Philosophy is also conferred after the satisfactory completion of the course in History and Political Science.

The degree of Bachelor of Science is conferred after the satisfactory completion of any one of the following courses: Science, Science and Letters, Chemistry and Physics, Analytical Chemistry, Electrical Engineering, Mathematics, and Natural History. The particular course is specified in the diploma.

The degree of Bachelor of Veterinary Science is conferred only after the completion of a full course of four years in that department.

No person may take more than one degree the same year.

Graduation Thesis.

Each student, before taking a degree, must submit to the Faculty a satisfactory oration, poem, or essay on some subject in science, literature, or art, and deposit a copy in the Library. A successful thesis written for final honors may, at the student's option, be presented as his thesis for graduation.

A fee of \$5, to cover expenses of graduation, degrees, etc., is charged to each person taking the baccalaureate degree. This fee must be paid before the degree is conferred.

Certificate of Licentiate.

Licentiate certificates and certificates of proficiency are conferred upon students who have pursued a special branch of knowledge and made distinguished proficiency therein. They are given upon the recommendation of the respective Faculties.

II. ADVANCED DEGREES.

Courses of study for graduates leading to advanced degrees are provided for in the following departments: Chemistry and Physics, Mathematics, Natural History; History and Political Science; Comparative Philology, Ancient Classical Languages and Literatures, Modern European Languages and Literatures, Oriental Languages and Literatures; Philosophy and Letters. Persons wishing to take an advanced degree in any of the above departments must apply to the Faculty to be admitted as candidates.

1. The Degree of Master.

The degree of Master of Arts or Master of Science is conferred on those who have taken the corresponding baccalaureate degree here, or wherever the requirements for that degree are equal to those of this University, on the following conditions:

1. The candidate must spend at least one year at the University in a course of study marked out for him by the Faculty, must present a satisfactory thesis, and pass an examination.

2. The same degrees are conferred without residence on graduates of this University only, on conditions the same as above, except that the degree is not given until three years after the baccalaureate degree has been conferred.

3. Graduates of this University may become candidates for either of the above second degrees by passing such additional examinations as are required for the corresponding first degree.

The degree of Master of Science is conferred on graduates in Philosophy on the same conditions as on graduates in Science.

2. The Degree of Civil Engineer.

The degree of Civil Engineer is conferred (1) on bachelors of Civil Engineering, after two years of study and practice, on passing the requisite examinations and presenting a satisfactory thesis; (2) on those who have completed the five-year course.

3. The Degree of Doctor.

The Degree of Doctor of Veterinary Medicine is conferred on

bachelors of Veterinary Science, after two years of additional study, on passing the requisite examination.

The degree of Doctor of Philosophy is conferred on graduates of this University, and of other universities and colleges whose requirements for the baccalaureate degree are equal to those of this University, on the following conditions:

1. In order to become a candidate the applicant must have, over and above what is required for graduation in the course in Philosophy, a knowledge of Greek equal to that required for admission to the course in Arts.

2. The candidate must spend at least two years at the University pursuing a course of study marked out by the Faculty.

3. He must, at least six weeks before Commencement, present a meritorious thesis upon some subject included in the course, and pass the requisite examinations.

The degree of Doctor of Science is conferred on graduates of this University, and of other universities and colleges whose requirements for the baccalaureate degree are equal to those of this University, on the following conditions:

1. In order to become a candidate the applicant must have: a knowledge of Latin and Greek at least equal to that required for admission to the course in Natural History; a knowledge of French and German equal to that required for graduation in Science; a knowledge of mathematics, of science, of literature, and of philosophy equal to that required for graduation in Philosophy.

2. The candidate must spend at least three years, two of them at this University, in the study of not less than two scientific subjects approved by the Faculty, in one or more of the departments of Chemistry and Physics, Mathematics, and Natural History.

3. He must pass an examination upon these subjects, showing in one of them special attainments, and must present a meritorious thesis based on special investigations, or make some other contribution to science.

Candidates for the degree of Doctor must print their theses and deposit ten copies in the Library. Candidates for other advanced degrees must deposit one copy.

No student in a post-graduate course is allowed to take two degrees for the same course, to take any inferior degree for any part of the study that leads to a higher one, or to be a candidate for more than one degree at the same time.

Candidates for a second degree must make application to the Registrar and present their theses at least twenty days before Commencement. The examinations for advanced degrees are held the second week before Commencement.

The fee charged for a second degree is $10, and must in all cases be paid to the Treasurer before the degree is granted.

COURSES OF STUDY.

GENERAL COURSES.

THE COURSE IN ARTS.

Leading to the Degree of Bachelor of Arts.

FRESHMAN YEAR.

Fall Term.—Grecian history, 2; Greek, 3; Latin, 4; rhetoric, 2; geometry and conic sections, 5; military drill, 2; hygiene, six lectures.

Winter Term.—Roman history, 2; Greek, 3; Latin, 4; rhetoric, 2; algebra, 5.

Spring Term.—Roman history, 2; Greek, 3; Latin, 4; rhetoric, 2; trigonometry, 5; military drill, 2.

SOPHOMORE YEAR.

Fall Term.—Greek, 3; Latin, 4; physics, 3; essays and declamations, 1; military drill, 2; *optional*, 4.

Winter Term.—Greek, 3; Latin, 4; physics, 3; essays and declamations, 1; *optional*, 4.

Spring Term.—Greek, 3; Latin, 4; physics, 3; essays and declamations, 1; military drill, 2; *optional*, 4.

JUNIOR YEAR.

Fall Term.—Essays, 1; psychology, 2; *optional*, 12.

Winter Term.—Essays and orations, 2; moral philosophy, 2; *optional*, 11.

Spring Term.—Essays and orations, 2; logic, 3; *optional*, 10.

SENIOR YEAR.

Fall Term.—Literature and oratory, 3; history of philosophy, 3; *optional*, 9.

Winter Term.—Literature and oratory, 3; military science, 2: *optional*, 12.

SPRING TERM.—Literature and oratory, 1; *optional*, 11; thesis. Students electing *chemistry* must continue the study through the two terms.

THE COURSE IN LITERATURE.

Leading to the Degree of Bachelor of Literature.

FRESHMAN YEAR.

FALL TERM.—French *or* German, 3 (both languages are required in the course); Latin, 4; rhetoric, 2; geometry and conic sections, 5; Grecian history, 2; military drill, 2; hygiene, six lectures.

WINTER TERM.—French *or* German, 3; Latin, 4; rhetoric, 2; algebra, 5; Roman history, 2.

SPRING TERM.—French *or* German, 3; Latin, 4; rhetoric, 2; trigonometry, 5; Roman history, 2; military drill, 2.

SOPHOMORE YEAR.

FALL TERM.—Anglo-Saxon, 3; French *or* German, 5; Latin, 4; essays and declamations, 1; physiology, 3; military drill, 2.

WINTER TERM.—Anglo-Saxon, 3; French *or* German, 5; Latin, 4; essays and declamations, 1; *optional*, 3.

SPRING TERM.—Anglo-Saxon, 3; French *or* German, 5; Latin, 4; essays and declamations, 1; botany, 3; military drill, 2.

JUNIOR YEAR.

FALL TERM.—Early English, 3; English literature, general course, 3; Italian *or* Spanish, 2; essays, 1; psychology, 2; Latin, modern languages, *or* science, 4.

WINTER TERM.—Early English, 3; English literature, general course, 3; Italian *or* Spanish, 2; essays and orations, 2; moral philosophy, 2; Latin, modern languages, *or* science, 4.

SPRING TERM.—Early English, 3; English literature, general course, 3; Italian *or* Spanish, 2; essays and orations, 2; logic, 3; Latin, modern languages, *or* science, 4.

SENIOR YEAR.

FALL TERM.—English literature, special course, 2; literature and oratory, 3; history of philosophy, 3; Latin, modern languages, *or* science, 7.

WINTER TERM.—English literature, special course 2; literature and oratory, 3; philosophy of history, 3; military science, 2; Latin, modern languages, *or* science, 7.

SPRING TERM.—English literature, special course, 2; literature and oratory, 1; American law, 5; Latin, modern languages, *or* science, 4; preparation of thesis.

THE COURSE IN PHILOSOPHY.

Leading to the Degree of Bachelor of Philosophy.

FRESHMAN YEAR.

FALL TERM.—French *or* German, 5 (both languages are required in the course); Latin, 4; rhetoric, 2; geometry and conic sections, 5; military drill, 2; hygiene, six lectures.

WINTER TERM.—French *or* German, 5; Latin, 4; rhetoric, 2; algebra, 5.

SPRING TERM.—French *or* German, 5; Latin, 4; rhetoric, 2; trigonometry, 5; military drill, 2.

SOPHOMORE YEAR.

FALL TERM.—French *or* German, 3; essays and declamations, 1; analytical geometry, 5; experimental mechanics and heat, 3; zoölogy, lectures and laboratory work (invertebrate), 3; military drill, 2.

WINTER TERM.—French *or* German, 3; essays and declamations, 1; electricity and magnetism, 3; chemistry, lectures, 3; zoölogy, lectures and laboratory work (vertebrates), 3; Latin, modern languages, mathematics, *or* science, 3.

SPRING TERM.—French *or* German, 3; essays and declamations, 1; acoustics and optics, 3; chemistry, lectures, 3; botany, 3; military drill, 2; Latin, modern languages, mathematics, *or* science, 3.

JUNIOR YEAR.

FALL TERM.—English literature, 3; essays, 1; physics *or* chemistry, laboratory work, 3; geology, 3; psychology, 2; languages, mathematics, *or* science, 4.

WINTER TERM.—English literature, 3; essays and orations, 2; descriptive astronomy, 3; general palæontology, 2; physics *or* chemistry, laboratory work, 4; moral philosophy, 2.

SPRING TERM.—English literature, 3; essays and orations, 2; physical astronomy, 3; physics *or* chemistry, laboratory work, 3; logic, 3; languages, mathematics, *or* science, 2.

SENIOR YEAR.

FALL TERM.—Literature and oratory, 3; history of philosophy, 3; *optional*, 9.

WINTER TERM.—Literature and oratory, 3; philosophy of history, 3; military science, 2; *optional*, 9.

SPRING TERM.—Literature and oratory, 1; American law, 5; *optional*, 6; preparation of thesis.

Students in Philosophy may take the Grecian and Roman history of the first year as an extra study and receive credit therefor towards graduation.

THE COURSE IN SCIENCE.

Leading to the Degree of Bachelor of Science.

FRESHMAN YEAR.

FALL TERM.—French, 5, and German, 3, *or* German, 5, and French, 3; rhetoric, 2; geometry and conic sections, 5; military drill, 2; hygiene, six lectures.

WINTER TERM.—French, 5, and German, 3, *or* German, 5, and French, 3; rhetoric, 2; algebra, 5; linear drawing, 2.

SPRING TERM.—French, 5, and German, 3, *or* German, 5, and French, 3; trigonometry, 5; descriptive geometry, text and drawing, 4; military drill, 2.

SOPHOMORE YEAR.

FALL TERM.—French *or* German, 3; essays and declamations, 1; analytical geometry, 5; experimental mechanics and heat, 3; zoölogy, lectures and laboratory work (invertebrates), 3; military drill, 2.

WINTER TERM.—French *or* German, 3; essays and declamations, 1; electricity and magnetism, 3; chemistry, lectures, 3; zoölogy, lectures and laboratory work (vertebrates), 3; chemistry *or* zoölogy (vertebrates), laboratory work, 3.

SPRING TERM.—French *or* German, 3; essays and declamations, 1; acoustics and optics, 3; chemistry, lectures, 3; blowpipe analysis, 1; botany, 3; military drill, 2.

JUNIOR YEAR.

FALL TERM.—English literature, 3; essays, 1; physics, laboratory work, 3; organic chemistry, 2; geology, 3; *optional* five

hours, of which at least three must be given to one of the following sciences: *botany*, *chemistry* (including *mineralogy*), *zoölogy*.

WINTER TERM.—English literature, 3; essays and orations, 2; descriptive astronomy, 3; physics, laboratory work, 3; general palæontology, 2; *optional*, three hours, which must be given to one of the following sciences: *botany*, *chemistry*, *zoölogy*.

SPRING TERM.—English literature, 3; essays and orations, 2; physical astronomy, 3; physics, laboratory work, 3; *optional*, five hours, of which at least three must be given to one of the following sciences: *botany*, *chemistry*, *geology*, *zoölogy*.

SENIOR YEAR.

FALL TERM.—*Optional*, fifteen hours, of which at least eight must be given to two of the following sciences (three or five hours to each): *botany*, *chemistry*, *geology*, *zoölogy*.

WINTER TERM.—Political economy, 2; military science, 2; advanced palæontology, 3; *optional*, ten hours, subject to the same conditions as in the fall term.

SPRING TERM.—Constitution of the United States, twelve lectures; *optional*, eleven hours, subject to the same conditions as in the fall term; preparation of thesis.

The optional hours not required for science in the junior and senior years may be devoted to either scientific, literary, historical, or philosophical subjects. In electing their studies in science for the junior and senior years, students must take at least the minimum given throughout the year of each science chosen.

Students taking the physics of the senior year must have had the calculus of the sophomore year; those taking the geology of the senior year must have had the blowpipe determination of minerals of the sophomore year.

THE COURSE IN SCIENCE AND LETTERS.

Leading to the degree of Bachelor of Science.

FRESHMAN YEAR.

FALL TERM.—French, 5, and German, 3, *or* German, 5, and French, 3; rhetoric, 2; geometry and conic sections, 5; military drill, 2; hygiene, six lectures.

WINTER TERM.—French, 5, and German, 3, *or* German, 5, and French, 3; rhetoric, 2; algebra, 5.

SPRING TERM.—French, 5, and German, 3, *or* German, 5, and French, 3; rhetoric, 2; trigonometry, 5; military drill, 2.

SOPHOMORE YEAR.

FALL TERM.—French *or* German, 3; essays and declamations, 1; physiology, 3; experimental mechanics and heat, 3; zoölogy, lectures and laboratory work (invertebrates), 3; modern languages, mathematics, *or* science, 2; military drill, 2.

WINTER TERM.—French *or* German, 3; essays and declamations, 1; electricity and magnetism, 3; chemistry, lectures, 3; zoölogy, lectures and laboratory work (vertebrates), 3; modern languages, mathematics, *or* science, 2.

SPRING TERM.—French *or* German, 3; essays and declamations, 1; acoustics and optics, 3; chemistry, lectures, 3; botany, 3; modern languages, mathematics, *or* science, 2; military drill, 2.

JUNIOR YEAR.

FALL TERM.—English literature, 3; essays, 1; psychology, 2; geology, 3; *optional*, 7.

WINTER TERM.—English literature, 3; essays and orations, 2; descriptive astronomy, 3; moral philosophy, 2; general palæontology, 2; *optional*, 4.

SPRING TERM.—English literature, 3; essays and orations, 2; physical astronomy, 3; logic, 3; *optional*, 5.

SENIOR YEAR.

FALL TERM.—Literature and oratory, 3; history of philosophy, 3; *optional*, 9.

WINTER TERM.—Literature and oratory, 3; philosophy of history, 3; military science, 2; *optional*, 9.

SPRING TERM.—Literature and oratory, 1; American law, 5; *optional*, 6; preparation of thesis.

SPECIAL AND TECHNICAL COURSES.

THE COURSE IN AGRICULTURE.

Leading to the Degree of Bachelor of Agriculture.

FRESHMAN YEAR.

FALL TERM.—French *or* German, 5; rhetoric, 2; geometry and conic sections, 5; freehand drawing, 3; military drill, 2; hygiene, six lectures.

Winter Term.—French *or* German, 5; rhetoric, 2; algebra, 5; freehand drawing, 3.

Spring Term.—French *or* German, 5; rhetoric, 2; trigonometry, 5; agricultural chemistry, lectures and laboratory work, 3; military drill, 2.

SOPHOMORE YEAR.

Fall Term.—French *or* German, 3; experimental mechanics and heat, 3; agricultural chemistry, 5; chemistry, qualitative analysis, 3; anatomy, laboratory work, 2; military drill, 2.

Winter Term.—French *or* German, 3; electricity and magnetism, 3; agricultural chemistry, lectures, 4; chemistry, qualitative analysis, 2; zoölogy, lectures and laboratory work (vertebrates), 3; anatomy, laboratory work, 2.

Spring Term.—French *or* German, 3; acoustics and optics, 3; land surveying, 4; botany, lectures, 3; field-work, 2; blowpipe analysis and determinative mineralogy, 2; military drill, 2.

JUNIOR YEAR.

Fall Term.—Botany, compositæ and gramineæ, 3; arboriculture and landscape gardening, 2; geology, 3; veterinary anatomy and physiology, 5; botany *or* chemistry, laboratory work, 3.

Winter Term.—Chemistry, quantitative analysis, 6; vegetable physiology, 3; vegetable histology, 2; veterinary pathology, sanitary science and parasites, 5.

Spring Term.—Chemistry, quantitative analysis, 7; entomology, lectures, 2, laboratory work, 2; veterinary medicine and surgery, 5.

SENIOR YEAR.

Fall Term.—Agriculture, lectures, 5, field-work, 3; fungi and algæ, 4; principles of horticulture, 2; entomology, laboratory work, 3.

Winter Term.—Agriculture, lectures, 5, field-work, 2; systematic and applied botany, 3; botany *or* chemistry, laboratory work, 5; military science, 2.

Spring Term.—Agriculture, lectures, 3, field-work, 3; building materials and construction, 2; American law, 5.

THE COURSE IN ARCHITECTURE.

Leading to the Degree of Bachelor of Architecture.

FRESHMAN YEAR.

FALL TERM.—French *or* German, 5; rhetoric, 2; geometry and conic sections, 5; freehand drawing, 3; linear drawing, 1; military drill, 2; hygiene, six lectures.

WINTER TERM.—French *or* German, 5; rhetoric, 2; algebra, 5; freehand drawing, 3; projection and tinting, 1.

SPRING TERM.—French *or* German, 5; trigonometry, 5; descriptive geometry, text and drawing, 4; botany, 3; military drill, 2.

SOPHOMORE YEAR.

FALL TERM.—French *or* German, 3; composition and elocution, 1; analytical geometry, 5; descriptive geometry, text and drawing, 6; experimental mechanics and heat, 3; military drill, 2.

WINTER TERM.—French *or* German, 3; composition and elocution, 1; calculus, 5; drawing, 3; electricity and magnetism, 3; chemistry, lectures, 3.

SPRING TERM.—French *or* German, 3; composition and elocution, 1; drawing, 1; acoustics and optics, 3; chemistry, lectures, 3; blowpipe analysis and determinative mineralogy, 2; building materials and construction, 3; military drill, 2.

JUNIOR YEAR.

FALL TERM.—Mechanics, strength of materials, 3; shades, shadows, and perspective, 3; drawing, 3; Egyptian, Greek, and Roman architecture, 3; designing, 4.

WINTER TERM.—Mechanics, trusses, 3; Byzantine and Romanesque architecture, 5; designing, 3; construction, 2; economic geology, 3.

SPRING TERM.—Mechanics, arches, 3; freehand drawing, 3; Gothic architecture, 5; designing, 3; construction, 2.

SENIOR YEAR.

FALL TERM.—Renaissance architecture, 3; decoration, 3; designing, 6; stereotomy, 3.

WINTER TERM.—Modern architecture, 3; designing, 7; stereotomy applied to stone-cutting, 5; military science, 2.

SPRING TERM.—Acoustics, ventilation, warming, professional practice, measuring, contracts, specifications, etc., 5; designing, 7.

THE COURSE IN ANALYTICAL CHEMISTRY.

Leading to the Degree of Bachelor of Science.

FRESHMAN YEAR.

FALL TERM.—French, 5, and German, 3, *or* German, 5, and French, 3; rhetoric, 2; geometry and conic sections, 5; military drill, 2; hygiene, six lectures.

WINTER TERM.—French *or* German, 5; rhetoric, 2; algebra, 5; chemistry, lectures, 3, laboratory work, 3.

SPRING TERM.—French *or* German, 5; rhetoric, 2; trigonometry, 5; chemistry, lectures, 3, laboratory work, 3; military drill, 2.

SOPHOMORE YEAR.

FALL TERM.—Analytical geometry, 5; experimental mechanics and heat, 3; organic chemistry, 2; chemistry, laboratory work, 8; military drill, 2.

WINTER TERM.—Electricity and magnetism, 3; chemistry, laboratory work, 15.

SPRING TERM.—Acoustics and optics, 3; physics, laboratory work, 3; chemistry, laboratory work, 9, blowpipe analysis, 3; military drill, 2.

JUNIOR YEAR.

FALL TERM.—Chemical philosophy, 3; chemistry, laboratory work, 9; mineralogy, 3; geology, 3.

WINTER TERM.—Chemical philosophy, 3; chemistry, laboratory work, 9; assaying, 3; economic geology, 3.

SPRING TERM.—Chemical philosophy, 3; chemistry, laboratory work, 15.

SENIOR YEAR.

FALL TERM.—Chemistry, laboratory work, 18.

WINTER TERM.—Chemistry, laboratory work, 18; military science, 2.

SPRING TERM.—Chemistry, laboratory work, 15; preparation of thesis.

THE COURSE IN CHEMISTRY AND PHYSICS.

Leading to the Degree of Bachelor of Science.

FRESHMAN YEAR.

FALL TERM.—French, 5, and German, 3, *or* German, 5, and French, 3; rhetoric, 2; geometry and conic sections, 5; military drill, 2; hygiene, six lectures.

Winter Term.—French, 5, and German, 3, *or* German, 5, and French, 3; rhetoric, 2; algebra, 5.

Spring Term.—French, 5, and German, 3, *or* German, 5, and French, 3; rhetoric, 2; trigonometry, 5; millitary drill, 2.

SOPHOMORE YEAR.

Fall Term.—French *or* German, 3; essays and declamations, 1; analytical geometry, 5; experimental mechanics and heat, 3; chemistry, laboratory work, 3; military drill, 2.

Winter Term.—French *or* German, 3; electricity and magnetism, 3; chemistry, lectures, 3; laboratory work, 8.

Spring Term.—French *or* German, 3; acoustics and optics, 3; chemistry, lectures, 3, blowpipe analysis, 3; botany, 3; military drill, 2.

JUNIOR YEAR.

Fall Term.—Organic chemistry, 2; mineralogy, 3; chemistry and physics, laboratory work, 8; *optional, science*, 3.

Winter Term.—Chemical philosophy, 3; metallurgy, 2; chemistry and physics, laboratory work, 9; *optional, science*, 3.

Spring Term.—Chemical philosphy, 3; chemistry and physics, laboratory work, 11; *optional, science*, 3.

SENIOR YEAR.

Fall Term.—Chemical journals, 1; history of philosophy, 3; chemistry and physics, laboratory work, 10; *optional, science*, 3.

Winter Term.—Chemical journals, 1; metallurgy, 2; chemistry and physics, laboratory work, 9; milltary science, 2; *optional, science*, 3.

Spring Term.—Chemical journals, 1; chemistry and physics, laboratory work, 12; preparation of thesis.

Of the laboratory work of the junior and senior years not less than four hours must be given to chemistry each term, and not less than four hours to physics.

THE COURSES IN CIVIL ENGINEERING.

I. A FOUR-YEAR COURSE.

Leading to the Degree of Bachelor of Civil Engineering.

FRESHMAN YEAR.

Fall Term.—French *or* German, 5; rhetoric, 2; geometry and conic sections, 5; freehand drawing, 3; technical essays, 1; military drill, 2; hygiene, six lectures.

WINTER TERM.—French *or* German, 5; rhetoric, 2; algebra, 5; freehand drawing, 3; linear drawing, 2; technical essays, 1.

SPRING TERM.—French *or* German, 5; trigonometry, 5; descriptive geometry, text and drawing, 4; botany, 3; technical essays, 1; military drill, 2.

SOPHOMORE YEAR.

FALL TERM.—French *or* German, 3; analytical geometry, 5; descriptive geometry, text and drawing, 6; experimental mechanics and heat, 3; technical essays, 1; military drill, 2.

WINTER TERM.—French *or* German, 3; calculus, 5; pen topography, 2; tinting and shading, 2; electricity and magnetism, 3; chemistry, lectures, 3; technical essays, 1.

SPRING TERM.—Calculus, 5; land surveying, 4; acoustics and optics, 3; chemistry, lectures, 3; blowpipe analysis, 1; technical essays, 1; military drill, 2.

JUNIOR YEAR.

FALL TERM.—Calculus, 5; mineralogy, 2; shades, shadows, and perspective, 3; topographical mapping and sketching, 2; lettering, 1; kinematics, *or* physics, laboratory work, 3; technical essays, 1.

WINTER TERM.—Mechanics of engineering, 5; detail drawing and graining, 2; physics, laboratory work, 3; metallurgy, 2; economic geology, 3; technical essays, 1.

SPRING TERM.—Mechanics of engineering, 4; railroad surveying, 4; colored topography, 3; lettering, 2; lake work, 3; technical essays, 1.

SENIOR YEAR.

FALL TERM.—Mechanics of engineering, 5; spherical astronomy, 5; practical astronomy, night observations, 2; Egyptian, Greek, and Roman architecture, *or* physics, laboratory work, 3; stereotomy and original problems, 3; civil engineering, 2; technical essays, 1.

WINTER TERM.—Hydraulics, 5; higher geodesy, 5; bridge stresses, 2; stone-cutting and original problems and practice, 5; technical essays, 1; military science, 2.

SPRING TERM.—Hydraulic motors, 2; civil engineering, 2; engineering economy, 2; bridge stresses, 4; hydrographic surveying, chart-making, and geodesy, field-work, 3; lake work, 3; technical essays, 1; preparation of thesis.

Students in the course in civil engineering are required to write essays upon professional subjects; and these essays are

read and discussed at the weekly meetings of the Civil Engineering Association.

II. A FIVE-YEAR COURSE.

Leading to the Degree of Civil Engineer.

The first four years are the same as in the four-year course. The choice of *optionals* in the fifth year is subject to the approval of the head of the department.

Students in the fifth year pay no tuition fees and have all the privileges of resident graduates.

FIFTH YEAR.

FALL TERM.—Riparian rights and law of contracts, 3; bridge construction and details, 3; projects, designs, and specifications, 3.

Optional, 9: Grecian history, 2; modern history, 3; psychology, 2; American history, 3; physiology and zoölogy, 6; languages, 2; technical reading, 2; renaissance architecture, 3; chemistry, laboratory work, 3; engineering, laboratory work, 3; physics, laboratory work, 3; rock drills and air compressors, 3; the steam-engine, 3; mining projects, 3; geology, 3; mineralogy, 3; mathematics, 3.

WINTER TERM.—River and habor improvements, 3; advanced astronomy and geodesy, 3; technical reading, 2; projects, designs, and specifications, 2.

Optional, 8: Roman history, 2; American history, 3; political economy, 2; languages, 2; pure or applied mathematics, 5; zoölogy, 3; metallurgy, 3; chemistry, laboratory work, 3; engineering, laboratory work, 3; physics, laboratory work, 3; Romanesque architecture, 3; the steam-engine, 3; mining projects, 2; geology, 3.

SPRING TERM.—Sanitary engineering, 3; locomotive machines, etc., 3; projects, designs, and specifications, 2.

Optional, 6: Roman history, 2; modern history, 2; American history, 3; languages, 3; pure or applied mathematics, 4; historical or technical reading, 3; geology, 3; chemistry, laboratory work, 3; engineering, laboratory work, 3; physics, laboratory work, 3; Gothic architecture, 3; pumps and small machinery, 2; mining projects, 4; arch ribs, 3; geodesy, field-work.

THE COURSE IN ELECTRICAL ENGINEERING.

Leading to the Degree of Bachelor of Science.

FRESHMAN YEAR.

FALL TERM.—French *or* German, 5; rhetoric, 2; geometry and conic sections, 5; freehand drawing, 3; military drill, 2; hygiene, six lectures.

WINTER TERM.—French *or* German, 5; rhetoric, 2; algebra, 5; freehand drawing, 3; instrumental drawing, 2.

SPRING TERM.—French *or* German, 5; trigonometry, 5; descriptive geometry, text and drawing, 4; rhetoric, 2; military drill, 2.

SOPHOMORE YEAR.

FALL TERM.—French *or* German, 3; analytical geometry, 5; experimental mechanics and heat, 3; descriptive geometry, text and drawing, 6; military drill, 2.

WINTER TERM.—French *or* German, 3; calculus, 5; electricity and magnetism, 3; chemistry, lectures, 3; shop-work, 3.

SPRING TERM.—Calculus, 5; acoustics and optics, 3; chemistry, lectures, 3; mechanism drawing, 3; shop-work, 3; military drill, 2.

JUNIOR YEAR.

FALL TERM.—Calculus, 5; physics, laboratory work (mechanics, measurements), 3; chemistry, laboratory work, 3; mechanism, 3; shop-work, 3.

WINTER TERM.—Mechanics of engineering, 5; physics, laboratory work (electricity, general experiments), 3; chemistry, laboratory work, 3; mechanism, 3; shop-work, 3.

SPRING TERM.—Mechanics of engineering, 5; physics, laboratory work (acoustics and optics), 5; chemistry, laboratory work, 4; mechanical drawing, 3.

SENIOR YEAR.

FALL TERM.—Mechanics of engineering, 5; physics, lectures and laboratory work (testing of instruments and determinations of constants), 6; steam-engine, 3; mechanical drawing, 3.

WINTER TERM.—Physics, lectures and laboratory work (dynamo machines and electrical motors, tests of efficiency), 5; steam-engine, 3; hydraulics, 5; mechanical drawing, 4; military science, 2.

SPRING TERM.—Physics, lectures and laboratory work (photometry, tests of electric lamps, telegraph instruments, telegraph lines, and cables), 9; mechanical drawing, 3; preparation of thesis.

THE COURSE IN MECHANIC ARTS.

Leading to the Degree of Bachelor of Mechanical Engineering.

FRESHMAN YEAR.

FALL TERM.—German, 5; geometry and conic sections, 5; freehand drawing, 3; shop-work, 3; military drill, 2.

WINTER TERM.—German, 5; algebra, 5; freehand drawing, 3, instrumental drawing, 2; shop-work, 3.

SPRING TERM.—German, 5: trigonometry, 5; descriptive geometry, text and drawing, 4; shop-work, 3; military drill, 2.

SOPHOMORE YEAR.

FALL TERM.—German, 3; rhetoric, 2; analytical geometry, 5; experimental mechanics and heat, 3; shop-work, 3; military drill, 2.

WINTER TERM.—German, 3; rhetoric, 2; calculus, 5; electricity and magnetism, 3; mechanism drawing, 2; shop-work, 3.

SPRING TERM.—Calculus, 5; mechanism drawing, 4; mechanical drawing, 3; shop-work, 3; military drill, 2.

JUNIOR YEAR.

FALL TERM.—Calculus and analytical geometry, 5; descriptive geometry, text and drawing, 6; mechanism, 3; shop-work, 3.

WINTER TERM.—Mechanics of engineering, 5; mechanism, 3; physics, laboratory work, 3; chemistry, lectures, 3; shop-work, 3.

SPRING TERM.—Mechanics of engineering, 5; mechanical drawing, with shades, tinting, and perspective, 3; physics, laboratory work, 3: chemistry, lectures, 3; shop-work, 3.

SENIOR YEAR.

FALL TERM.—Mechanics of engineering, 5; mechanical and working drawings, 3; physics, laboratory work, 3; steam-engine, 3; shop-work, 3.

WINTER TERM.—Mèchanical drawing, 4; steam-engine, 3; metallurgy, 2; experimental work with indicators, governors, pumps and injectors, 3; shop-work, 3; military science, 2.

SPRING TERM.—Graphical statics, 3; the use of instruments and field-work, 3; building materials, 3: mechanical drawing and preparation of thesis, 3; shop-work, 3.

GRADUATE COURSE.

FALL TERM.—Machines for regulating, counting, etc., 3; mechanical *or* physical experiments, *or* chemistry, 3; riparian laws, contracts, patent-office laws, etc., 2. *Optional*, 7.

WINTER TERM.—Machine for change of form, 3; mechanical *or* physical experiments, *or* chemistry, 3; technical reading, 2. *Optional*, 7.

SPRING TERM.—Locomotive machines, hoists, cranes, etc., 3; mechanical *or* physical experiments, *or* chemistry, 3; shop systems and accounts, 2. *Optional*, 7.

The optional studies are hydraulics, assaying, blowpipe analysis and mineralogy, chemistry (laboratory work), physics, (acoustics and optics), motors other than steam, architecture, civil engineering, shop-work, mathematics, botany, French, rhetoric, history, literature.

THE COURSE IN MATHEMATICS.

Leading to the Degree of Bachelor of Science.

FRESHMAN YEAR.

FALL TERM.—French *or* German, 5; rhetoric, 2; geometry and conic sections, 5; freehand drawing, 3; military drill, 2; hygiene, six lectures.

WINTER TERM.—French *or* German, 5; rhetoric, 2; algebra, 5; freehand drawing, 3; linear drawing, 2.

SPRING TERM.—French *or* German, 5; rhetoric, 2; trigonometry, 5; descriptive geometry, text and drawing, 4; military drill, 2.

SOPHOMORE YEAR.

FALL TERM.—Analytical geometry, 5; mathematical essays, 1; experimental mechanics and heat, 3; descriptive geometry, text and drawing, 6; essays and declamations, 1; military drill, 2.

WINTER TERM.—Calculus, 5; projective geometry, French textbook, 4; mathematical essays, 1; electricity and magnetism, 3; chemistry, 3; essays and declamations, 1.

SPRING TERM.—Calculus, 5; mathematical essays, 1; acoustics and optics, 3; chemistry, 3; botany, 3; essays and declamations, 1; military drill, 2.

JUNIOR YEAR.

FALL TERM.—Calculus and analytical geometry, 5; mathematical essays, 1; physics, laboratory work, 3; shades, shadows, and perspective, 3; essays, 1; *optional, not mathematics*, 3.

Winter Term.—Differential equations, 5; descriptive astronomy, 3; mathematical essays, 1; physics, laboratory work, 3; essays and orations, 2; *optional, not mathematics*, 3.

Spring Term.—Differential equations and finite differences, 5; physical astronomy, 3; mathematical essays, 1; physics, laboratory work, 3; essays and orations, 2; *optional, not mathematics*, 3.

SENIOR YEAR.

Fall Term.—Imaginaries and elliptic functions, 3; mécanique analytique, 2; quaternions, *or* modern methods in analytical geometry, *or* applied mathematics, 4; mathematical essays, 1; English literature, 3; *optional, not mathematics*, 3.

Winter Term.—Imaginaries and elliptic functions, 3; mécanique analytique, 2; quaternions, *or* modern methods in analytical geometry, *or* applied mathematics, 4; mathematical essays, 1; English literature, 3; military science, 2; *optional, not mathematics*, 3.

Spring Term.—Imaginaries and elliptic functions, 3; mécanique analytique, 2; mathematical essays, 1; English literature, 3; Constitution of the United States, twelve lectures; *optional, not mathematics*, 3; preparation of thesis.

THE COURSE IN NATURAL HISTORY.

Leading to the Degree of Bachelor of Science.

FRESHMAN YEAR.

Fall Term.—French, 5, and German, 3, *or* German, 5, and French, 3; rhetoric, 2; chemistry, laboratory work, 3; freehand drawing, 3; military drill, 2; hygiene, six lectures.

Winter Term.—French, 5, and German, 3, *or* German, 5, and French, 3; rhetoric, 2; chemistry, lectures, 3; freehand drawing, 3.

Spring Term.—French, 5, and German, 3, *or* German, 5, and French, 3; chemistry, lectures, 3, laboratory work, 3; freehand drawing, 2; military drill, 2.

SOPHOMORE YEAR.

Fall Term.—French *or* German, 3; essays and declamations, 1; experimental mechanics and heat, 3; physiology, 3; zoölogy, lectures and laboratory work (invertebrates), 3; anatomy, laboratory work, 2; anatomical technology, 1; military drill, 2.

WINTER TERM.—French *or* German, 3; essays and declamations, 1; electricity and magnetism, 3; zoölogy, lectures and laboratory work (vertebrates), 3; laboratory work in physiological anatomy and histology, 5; microscopical technology, 1.

SPRING TERM.—French *or* German, 3; essays and declamations, 1; acoustics and optics, 3; blowpipe analysis, 1; botany, lectures, 3, field work, 2; anatomy, laboratory work, 2; museum methods and experimental technology, 1; military drill, 2.

JUNIOR YEAR.

FALL TERM.—Essays, 1; psychology, 2; physics, laboratory work, 2; chemistry, organic, *or* laboratory work, 2; mineralogy, 2; botany, compositæ and gramineæ, lectures and laboratory work, 3; geology, 3.

WINTER TERM.—Essays and orations, 1; descriptive astronomy, 3; physics, laboratory work, 2; systematic and applied botany, *or* vegetable physiology, 3; vegetable histology, 2; general palæontology, 2; laboratory work, 2.

SPRING TERM.—Essays and orations, 1; logic, 3; physical astronomy, 3; entomology, lectures, 2; geology, laboratory or field work, 3; *optional*, 4, in any two of the following subjects: physics, laboratory work, 2; botany, higher cryptogams, 2; comparative anatomy of the brain, 2; entomology, laboratory or field work, 2.

SENIOR YEAR.

FALL TERM.—History of philosophy *or* modern history, 3; botany, lower cryptogams, lectures and laboratory work, 4; palæontology *or* geology, laboratory and field work, 3; *optional*, 6, which may be devoted to any branch of natural history, including veterinary science.

WINTER TERM.—Modern history, 3; systematic and applied botany *or* vegetable physiology, 3; advanced palæontology, 3; military science, 2; *optional*, 5, which may be devoted to any branch of natural history, including veterinary science.

SPRING TERM.—Modern history, 2; palæontology, laboratory work, 3; *optional*, 9, which may be devoted to the preparation of a thesis, or to any branch of natural history, including veterinary science.

A TWO-YEAR COURSE PREPARATORY TO THE STUDY OF MEDICINE.

Not Leading to a Degree.

FRESHMAN YEAR.

FALL TERM.—French, 5; freehand drawing, 3; experimental mechanics and heat, 3; zoölogy, lectures and laboratory work (invertebrates), 3; physiology, 3; military drill, 2; hygiene, six lectures.

WINTER TERM.—French, 5; electricity and magnetism, 3; chemistry, lectures, 3, laboratory work, 3; zoölogy, lectures and laboratory work (vertebrates), 3.

SPRING TERM.—French, 5; acoustics and optics, 3; chemistry, lectures, 3; botany, lectures, 3, laboratory work, 2; military drill, 2.

SOPHOMORE YEAR.

FALL TERM.—German, 5; psychology, 2; organic chemistry, 2; anatomy, physiology, and hygiene of domestic animals, 5; anatomical technology, 1; anatomy, laboratory work, 2; military drill, 2.

WINTER TERM.—German, 5; vegetable physiology, 3; veterinary pathology, parasites, and sanitary science, 5; microscopical technology, 1; histology, laboratory work, 2; vegetable physiology, laboratory work, 2.

SPRING TERM.—German, 5; medical chemistry, 3; comparative anatomy of the brain, 2; anatomy, laboratory work, 2; museum methods and experimental technology, 1; veterinary medicine and surgery, 5; military drill, 2.

Upon the completion of this course, or its equivalent, the student is entitled to a certificate countersigned by the professor of physiology. These certificates usually exempt the holders from one of the three years study under the direction of a physician, commonly required for graduation in medicine.

THE COURSE IN HISTORY AND POLITICAL SCIENCE.

Leading to the Degree of Bachelor of Philosophy.

The first two years of this course are regarded as mainly introductory to the studies which peculiarly belong to the general

subjects of the course. Students who have completed the first two years in either of the courses in Arts, Literature, or Philosophy, may be admitted to full standing as juniors in the course in History and Political Science on passing a satisfactory examination in the History required in the first two years in this course.

Besides the prescribed work, lectures are given on important topics connected with the general subjects of the course by non-resident professors and lecturers; and these lectures, whenever given, must be attended by all the students in the course.

FRESHMAN YEAR.

FALL TERM.—French *or* German, 5 (both languages are required in the course); Latin, 4; rhetoric, 2; geometry and conic sections, 5; military drill, 2.

WINTER TERM.—French *or* German, 5; Latin, 4; rhetoric, 2; algebra, 5.

SPRING TERM.—General European history, 2; French *or* German, 5; Latin, 4: rhetoric, 2; plane trigonometry, 3; military drill, 2.

SOPHOMORE YEAR.

FALL TERM.—Grecian history, 2; English history, 3; French, 3; German, 3; essays and declamations, 1; Greek, Latin, modern languages, mathematics, *or* natural sciences, 3.

WINTER TERM.—Roman History, 2; English history, 3; French, 3; German, 3; essays and declamations, 1; Greek, Latin, modern languages, mathematics, *or* natural sciences, 3.

SPRING TERM.—Roman history, 2; English history, 3; French, 3; German, 3; essays and declamations, 1; theory of probabilities and statistics, 3; military drill, 2.

JUNIOR YEAR.

FALL TERM.—American history, 3; English constitutional history, or systematic politics, 5; mediæval and modern history, 3; psychology, 2; sanitary science, labor laws, and penal discipline, or *optional*, 2.

WINTER TERM.—American history, 3; modern history, 3; political economy, 2; moral philosophy and political ethics, 2; essays and orations, 2; *optional*, 3.

SPRING TERM.—American history, 3; modern history, 2; political economy, 2; logic, 3; essays and orations, 2; *optional*, 3.

SENIOR YEAR.

Fall Term.—American history, 3; modern history, 3; English constitutional history, or systematic politics, 5; history of philosophy and the natural sciences, 3.

Winter Term.—American history, 3; modern history, 3; philosophy of history, 3; international law, 5; military science, 2.

Spring Term.—American history, 3; modern history, 2; American law and jurisprudence, 5; finance and political economy, 5; preparation of thesis.

GENERAL DEPARTMENTS OF INSTRUCTION.

Any person wishing more detailed information than is given in the Register as to courses of study, methods of instruction, etc., may address the professor in charge of the department to which his inquiries relate.

AGRICULTURE.

I. APPLIED AGRICULTURE.

The requirements for admission to the course in Agriculture are such as to put the advantages which it offers within the reach of every young man who has made good use of the instruction afforded in the public schools. The instruction is given by lectures and recitations, illustrated with the aid of the Auzoux models and various other collections belonging to the University. Besides the class-room exercises, the student devotes as much time as can be spared to practice in the botanical, chemical, and veterinary laboratories, as well as in the fields and barns.

In Applied Agriculture, five hours a week, during the senior year, are devoted to technical instruction in all its leading, and most of its minor, branches. The student is also required to spend three hours a day, two days in each week, in field work, and in the handling and feeding of domestic animals; and if this amount of practice does not prove sufficient to make him familiar with the various operations of the farm, additional time is required during the summer vacation.

The instruction by lectures begins with the senior year, and continues through the three terms of that year.

Fall Term: Wheat—culture, varieties, preparation of the soil, seeding, injurious insects, harvesting, threshing, marketing;

Swine—the history of breeds, feeding, general management, piggeries; Farm Buildings—location, plans, material, construction, repairs and preservation, contracts, liabilities of contractors; Fields—shape and size; Fences and Gates—construction, number, kind, repairs, durability of wood used; Farm and public roads, bridges and culverts—location, construction, repairs; Farms—selection and purchase with regard to remoteness or nearness to markets, agricultural capabilities, roads, improvements, schools, and society; Titles, deeds, judgments, and mortgages; Farm-Yard Manures—composition, manufacture, preservation, application; Commercial Fertilizers—composition, application, utility.

Winter Term: Farm Accounts; Principles of Stock-breeding—law of similarity, of variation as caused by food, habit and climate, atavism, relative influence of male and female, prepotency, sex, in-and-in breeding, crossing and out-crossing, grading up or breeding in line; Races and Breeds—pedigrees, leading breeds of neat animals treated as to history, markings, characteristics, and adaptation to uses, soil, climate, and locality; Breeding, feeding, and management of cattle; Butter, cheese, and milk dairies, and beef production; Sheep Husbandry treated in detail same as cattle.

Spring Term: The Horse—breeds and breeding, education, care, driving, stables; Farm Drainage—mapping of drains, material, construction, utility; Plows and plowing; Farm Implements and Machinery—use, care, and repairs; Corn, oat, barley, and flax culture; Grasses and forage plants; Weeds and their eradication; Business customs, rights and privileges; Notes, contracts, and obligations; Employment and direction of laborers.

University Farm.

The Farm consists of 120 acres of arable land, the larger part of which is used for experimental purposes and the illustration of the principles of agriculture. Nearly all the domestic animals are kept to serve the same ends. Those portions of farm and stock not used for experiments are managed with a view to their greatest productiveness. Statistics of both experiments and management are kept on such a system as to show at the close of each year the profit or loss not only of the whole farm but of each crop and group of animals. Of the two barns with which the farm is equipped, one is largely devoted to the needs of the

Horticultural Department; the other, containing steam-engine, feed-cutter, stationary thresher, and other necessary appliances, furnishes accommodation for the general crops and stock, and for experimental work.

Instructor: Professor Roberts.

II. AGRICULTURAL CHEMISTRY.

The study of Agricultural Chemistry comprises lectures and analytical practice in the laboratory. The lectures, seventy-five in number, embrace the following general subjects:

The general principles of chemical science, accompanied by introductory laboratory work; the chemistry of the elements and their compounds that constitute soils, plants, and animals; investigators in agricultural chemistry, their methods and means of working, and the literature of agricultural chemistry; the chemistry of vegetable life, and the production of vegetable substance in general; the physical and chemical properties and agricultural resources of the soil; tillage, drainage, etc., and amendments and manures; the composition of crops and other materials used for fodder; animal chemistry and nutrition; fermentation and putrefaction; milk and its manufactured products and residues; food, water, and air in their relations to human and animal life; the chemical analysis of fodder and food; farm crops and their manufactured products and residues.

The analysis of agricultural materials and products is treated in a course of chemical practice, as described under the head of Analytical Chemistry.

Instructor: Professor Caldwell.

III. ECONOMIC ENTOMOLOGY.

The course comprises lectures, laboratory work, and field practice. There are two lectures per week during the spring term. In these lectures the characters of the orders, sub-orders, and the more important families are discussed; and especial attention is given to the study of the species which are of economic importance.

The laboratory and field work extends through two terms. In this part of the course the student is taught to determine species; and to make and prepare for publication original observations on the habits and structure of insects. For further details regarding the instruction in Entomology see this subject under the general head of Natural History.

ENTOMOLOGICAL CABINET AND LABORATORY.

The entomological cabinet contains, in addition to many exotic insects, specimens of a large proportion of the more common species of the north-eastern United States. These specimens are arranged in two collections: one biological, containing specimens illustrative of the metamorphoses and habits of insects; the other systematic, in which the species are arranged so as to show their zoölogical affinities.

The Laboratory is equipped with a set of Auzoux models, microscopes, breeding cages, and other apparatus necessary for practical work in entomology.

Instructor: Professor Comstock.

IV. HORTICULTURE.

The instruction comprises two courses of lectures during the fall term, supplemented by experimental or practical work.

Junior Year: A course of lectures upon arboriculture and landscape gardening.

Senior Year: A course of lectures upon the principles of horticulture.

Additional time is given to experimental work in the garden or conservatories. The instruction in botany, both in the laboratory and in the several courses of lectures, is intended to afford a scientific basis for the special instruction given in horticulture.

Instructors: Professor Prentiss and Assistant Professor Dudley.

V. VETERINARY SCIENCE.

The regular course for students in Agriculture, Natural History, etc., embraces: five lectures a week during an entire academic year; laboratory work on the bones, clastic models, pathological preparations, and parasites of domestic animals; clinical instruction on cases occurring in practice.

Fall Term: Lectures on the anatomy and physiology of the animals of the farm. Attention is given to the principles of hygiene as affected by genus, breed, climate, soil, exposure, buildings, ventilation, drainage, food, and water; to the varying anatomical peculiarities which imply special aptitude for particular uses; to the data for determining age; to the principles of breeding, of shoeing, etc.

Winter Term: Lectures on general comparative pathology; on

specific fevers and other contagious diseases; on the parasites and parasitic diseases of domestic animals; and on constitutional diseases. An important feature in this course is the subject of veterinary sanitary science and police, embracing, as it does, the prevention of animal plagues by legislative and individual action; the improvement of unhealthy localities; and the destruction of animal poisons and parasites which are intercommunicable between man and the domestic animals.

Spring Term: Lectures on the local diseases of the various systems of organs in the different animals, and on veterinary surgery.

Opportunities are afforded to students who desire it to pursue the study of Veterinary Medicine and Surgery farther than is provided for in the regular courses of study.

Veterinary Museum.

The Museum embraces the following collections:

1. The Auzoux veterinary models, comprising clastic models of the horse, showing the relative position of over three thousand anatomical parts; models and limbs, sound and with detachable pieces and their morbid counterparts, illustrating changes in diseases of the bones, joints, muscles, etc.; a set of obstetrical models, showing the virgin and gravid uterus in different animals, and the peculiarities of the female pelvis and its joints; models of the gastric cavities of domestic animals; an extensive set of models of jaws, showing the indications of age as well as of vicious habits and diseases; models and equine teeth in sections, showing structure and the changes effected by wear.

2. Skeletons of the domestic animals, articulated and unarticulated.

3. A collection of diseased bones, illustrating the various constitutional diseases which impair the nutrition of these structures, together with the changes caused by accidental injuries and purely local disease.

4. Skulls of domestic animals, prepared to illustrate the surgical operations demanded in the different genera.

5. Jaws of farm animals, illustrating the growth and wear of the teeth, age, dentinal tumors, caries, etc.

6. A collection of specimens of teratology, consisting of monstrous foals, calves, and pigs.

7. A collection of tumors and morbid growths removed from the different domestic animals.

8. Some hundreds of specimens of parasites from domestic animals.

9. A collection of calculi from the digestive and urinary organs, etc., of farm animals.

10. Foreign bodies taken from various parts of the animal economy.

11. A collection of surgical instruments used in veterinary practice.

12. A collection of medicinal agents.

13. In addition, a large number of diagrams, the property of Professor Law, available in illustration of different points in anatomy, physiology, and pathology.

For the Course in Agriculture, see page 58.

Instructor: Professor Law.

ARCHITECTURE.

The Course in Architecture is so arranged as to give the student instruction in all subjects which he should understand in order to enter upon the practice of the art.

The instruction is given by means of lectures and practical exercises. Its object is not merely to develop the artistic powers of the student, but to lay that foundation of knowledge without which there can be no true art. Drawing is taught during the first two years, and afterward thoroughly used and applied in mechanics, stereotomy, and designing.

Architectural mechanics occupies a part of each term for one year. The lectures are each supplemented by at least two hours of work on problems. In developing the subjects and in solving problems, analytical methods are used, but for practical use special attention is paid to the application of graphical statics.

The study of the history of architecture and the development of the various styles runs through five terms. The lectures are illustrated by photographs, engravings, drawings, casts, and models.

Proper attention is paid to acoustics, ventilation, heating, decoration, contracts, and specifications. The whole ground of education in architecture, practical, scientific, historical, and æsthetic, is covered as completely as is practicable in a four-year course.

"Satisfactory attainments" for "special students" in Architecture will be as follows: Proficiency in all the branches of a good common-school education, in algebra and geometry, and in in-

strumental drawing. They must present themselves promptly at the beginning of the fall term of each year, and will not be admitted at any other time.

EQUIPMENT.

The White Architectural Library contains over one thousand volumes, and the photographic gallery nearly two thousand prints, all accessible to the student. Several hundred drawings, and about two hundred models in wood and stone have been prepared to illustrate the constructive forms and peculiarities of the different styles.

For the Course in Architecture see page 60.

Insctuctors: Professor Babcock and Assistant Professor Osborne.

FREEHAND DRAWING.

Instruction in Freehand Drawing is given by means of lectures and general exercises from the blackboard, from flat copies, and from models. The work embraces a thorough training of the hand and eye in outline drawing, elementary perspective, model and object drawing, drawing from casts, and sketching from nature.

The effort is not to make mere copyists, but to render the student familiar with the fundamental principles underlying this art, and to enable him to represent any object correctly and rapidly. The course is largely industrial, and the exercises are arranged, as far as possible, with special reference to the drawing required in the work of the different departments.

All students in the departments of Agriculture, Architecture, Civil Engineering, Electrical Engineering, Mechanic Arts, Mathematics, and Natural History devote two hours a day to freehand drawing during the first two terms of the freshman year; and students in Architecture, in addition, two hours a day during one term of the junior year. Students in the other courses may take drawing as an optional study.

EQUIPMENT.

The department has a large collection of studies of natural and conventional forms, both shaded and in outline; of geometrical models, and of papier-mâché and plaster casts, including a number of antique busts, casts of parts of the human figure, studies from nature, and examples of historical ornament.

Instructors: Professor Cleaves and Mr. C. D. White.

CHEMISTRY AND PHYSICS.

I. PHYSICS.

The instruction comprises a general course of lectures designed as an introduction to the study of the subject, an elementary laboratory course designed to give a general knowledge of the science, and an advanced laboratory course.

The general course occupies one year, the exercises consisting of two experimental lectures and one recitation weekly. The subjects are pursued as follows: fall term, experimental mechanics and heat; winter term, electricity and magnetism; spring term, acoustics and optics. A knowledge of mathematics through plane trigonometry is required for registration in either of the subjects; and for registration in electricity and magnetism or in acoustics and optics, a knowledge of experimental mechanics and heat is also required.

The general course is required of all students except those in History and Political Science, and Literature; but those in Mechanic Arts do not take acoustics and optics.

The elementary laboratory course consists of a series of simple experiments arranged to perfect and fix the student's knowledge of physical facts and laws, and at the same time give him some experience in physical manipulation. The course occupies seven and a half hours a week (equivalent to three hours of lectures) for one year. Considering the very elementary character of the general course, this is the minimum time that can be devoted to the work with profit to the student. The elementary laboratory course is required of all students in Mechanic Arts, Chemistry and Physics, Science, and Mathematics, and parts of it are required of those in Civil Engineering and Natural History.

Students are admitted to the laboratory to pursue only such subjects as they have completed in the general course of lectures.

The advanced laboratory course consists of a series of experiments for the establishment of physical laws and the determination of constants. Many of these experiments involve the most refined methods of measurement. Students entering this course are expected to devote to it at least seven and a half hours a week. They may enter for one or more terms at their option, and may, within certain limits, elect the line of work they wish to pursue. Special students will devote a part of their time to an original investigation.

The elementary laboratory course described above is required for admission in the advanced course. A knowledge of analytical geometry and calculus will also be found very useful.

APPARATUS.

Ample rooms expressly designed for laboratory work are available. The collection includes a fine gravity escapement clock, a chronograph for measuring tenths of seconds, and another for measuring short intervals of time to the ten-thousandth of a second, two cathetometers, a dividing engine, a large spectrometer reading to seconds, a set of apparatus for electrical measurements, a set of apparatus for heat measurements, Bjerkness' apparatus to show the analogy between magnetic phenomena and the phenomena of bodies vibrating in a fluid, besides a large collection of illustrative apparatus.

Instructors: Professor Anthony and Assistant Professor Moler.

II. DESCRIPTIVE AND THEORETICAL CHEMISTRY.

The instruction begins with lectures on inorganic chemistry in the winter term of the sophomore year, and continues through two terms. Three lectures a week are given on the theoretical principles and the general study of the chemistry of inorganic bodies. During the fall term of the junior year, a course of lectures is given on the chemistry of organic bodies. In addition to the final examination at the end of the term, occasional examinations are held during the term, of which no previous notice is given, the students being expected to hold themselves in readiness for such an examination at all times.

For laboratory instruction in this branch of the subject a course of introductory practice is given in the spring term of the sophomore year. This course is required of students in Science, and of those in Chemistry and Physics, in Analytical Chemistry, and in Agriculture; it is required, further, of all students who take chemical practice as an optional study, in the beginning of their practice, except those who can give only the minimum time (seven and a half hours a week) for two or three terms, and who for sufficient reasons desire to devote all that time to chemical analysis. This introductory practice consists in the performance by the student of a series of experiments illustrating the more important general principles of the science. The details of the

manipulation of each experiment are carefully described, but the results to be obtained are not given. For the better cultivation of the student's powers of observation he is required to observe and describe these results for himself, and trace their connection with the principles which they are intended to illustrate.

The instruction in theoretical chemistry is continued in the courses of Chemistry and Physics, and in Analytical Chemistry by recitations in chemical philosophy, and by lectures on organic chemistry.

For the Courses in Analytical Chemistry, and Chemistry and Physics see page 61.

Instructor: Professor Schaeffer.

III. MINERALOGY AND METALLURGY.

Blowpipe Analysis.—During the spring term of the sophomore year, instruction is given in qualitative blowpipe analysis, and in determinative mineralogy. The course is designed to enable the student to avail himself of the simple and effective means which the blowpipe affords in determining the nature of unknown substances. The work in determinative mineralogy comprises the identification of minerals by observation of their hardness, fusibility, blowpipe reactions, etc., and constitutes a necessary preparation for the study of systematic mineralogy and lithology. The laboratory of blowpipe analysis and mineralogy in the new chemical and physical building is supplied with all necessary conveniences for the aid of students in this department.

Mineralogy.—The study of systematic mineralogy is pursued during the fall term of the junior year, and comprises lectures, conferences, and the study of specimens. The study of crystallography forms an important part of the course of mineralogy, and includes lectures illustrated by a complete set of glass models, as well as laboratory practice in the identification of crystalline forms from blocks and actual specimens. Exceptional advantages for the study of mineralogy are offered by the large and well-arranged Silliman collection of minerals, which is accessible to students at all times. A complete and carefully selected students' collection affords abundant material for work in determinative mineralogy. Special attention is given to the more important metallic ores, as a preparation for the studies of economic geology and metallurgy.

Assaying.—A thorough course of practice in assaying is given

during the winter term of the junior year. Students are required to determine the value of gold, silver, and other metals contained in ores sufficient in number to make them familiar with the most approved methods in use in the West and in European mining regions. The assay of gold and silver bullion, as practiced in the national mints, forms a part of the course. The assay laboratory in the new building is equipped with every requisite for work in this branch, such as furnaces, tools, balances, etc.

Metallurgy.—During the winter term of the junior year two lectures a week are devoted to metallurgy. These lectures are intended to give the students in the technical courses a general idea of fuels, ores, and the most important methods of extracting the metals which are especially used in construction, the metallurgy of iron naturally claiming the most attention.

Optional Work.—Students pursuing courses in which blowpipe analysis, mineralogy, and assaying are not required, and who desire to pursue these studies as optional work, can take them only during the terms to which they are assigned in the schedule of the technical courses, and in the order indicated above. Thus, no one is admitted to work in blowpipe analysis who has not attended the lectures on inorganic chemistry; further, no one is admitted to the advanced class in mineralogy or assaying, or to the class in lithological laboratory work in the geological department, who has not completed one term's work in blowpipe analysis.

Instructors: Professor Schaeffer and Assistant Professor Newbury.

IV. AGRICULTURAL AND ANALYTICAL CHEMISTRY.

The general subject of Agricultural Chemistry is treated in a series of about seventy-five lectures, for an account of which see page 75.

The laboratory work in Analytical Chemistry, beginning in the sophomore year, comprises qualitative and quantitative analysis both in the wet way and in the dry way (blowpipe analysis and assaying), and is adapted in respect to length and completeness to the course of study the student is pursuing.

In Chemistry and Physics the qualitative analysis in the wet way and the blowpipe analysis are taken in the first two terms, beginning with the winter term of the sophomore year; this work may or may not, according to the proficiency attained in

these two terms, extend into the following term. In connection with the quantitative analysis, which occupies at least a large part of the time devoted to laboratory work in the junior and senior years of this course, some practice in qualitative analysis is continued.

The quantitative work begins with general practice in the determination of bases and acids by gravimetric and volumetric methods, after which follow the analysis of minerals, ores and technical products in the wet way, and dry assaying, ultimate, and proximate organic analysis, the analysis of gaseous mixtures, the sanitary examination of water, the technical examination of foods, beverages, and other articles of common use, spectroscopic analysis, the determination of vapor densities, the preparation of substances, and, finally, the thesis for graduation (provided that this be taken in Chemistry), to which most of the time of the last two terms of the course should be devoted.

In the course in Analytical Chemistry much the same order of chemical work is followed as in the course in Chemistry and Physics; but more time is given to its important subdivisions, affording to the student the opportunity of acquiring a more familiar knowledge of different methods of analysis, and greater celerity in their execution.

In the course in Agriculture, the analytical part of agricultural chemistry begins in the fall term of the sophomore year, and comprises analysis in the wet way and with the blowpipe. The qualitative analysis should be completed in two terms of this year, so that all the time given to the subject in the junior and senior years may be devoted to quantitative analysis. This quantitative work begins, as in Chemistry and Physics, with general practice in the determination of bases and acids by gravimetric and volumetric methods. The chemical examination of fertilizers, soils, and agricultural products occupies the remainder of the course.

In the Medical Preparatory Course, a short course of qualitative and quantitative analysis in the wet way is given, which may carry the student far enough to qualify him to examine animal liquids by chemical methods for assistance in the diagnosis of disease. The amount of practice necessary for acquiring merely the rudiments of chemical analysis renders it impracticable to accomplish more than this in the time allotted in the course. Students intending to study medicine who have more time for chem-

ical practice can take a longer and more thorough course, which includes a better foundation in quantitative work, and a wider application of the proficiency thus gained to the chemical examination of animal substances and articles of food and drink, and to medical jurisprudence.

Chemical Laboratory.

The new building for the department of Chemistry and Physics, completed during the summer of 1883, and now fully occupied, contains a museum, a library, laboratories, and lecture-rooms, and is thoroughly equipped with the most recent and approved appliances for the proper prosecution of the work of the department.

Instructors: Professor Caldwell, Mr. Holton and Mr. Lund.

CIVIL ENGINEERING.

The instruction is given by means of lectures and recitations, with drafting, and field and laboratory work. The field work embraces the usual operations and the more recent methods of land, railroad, and subterranean surveying, together with hydrography and geodetic practice; and since 1874 the department of Civil Engineering has been engaged in the surveys of the hydrographic basin of central New York, as a contribution to the geodetic surveys of the United States Government.

Laboratory work is provided in chemistry, mineralogy, metallurgy, geology, physics, and civil engineering.

The students of this department receive instruction in an extended course of mechanics, as applied to engineering, and their professional preparation comprises the following subjects: The location and construction of railroads, canals, and water-works, the construction of foundations, in water and on land, and of superstructures and tunnels; the surveys, improvements, and defenses of coasts, harbors, rivers, and lakes; the determination of astronomical co-ordinates; the application of mechanics, graphical statics, and descriptive geometry to the constructions of the various kinds of right and oblique arch bridges, roofs, trusses and suspension bridges; the design, construction, and application of wind and hydraulic motors, air, electric, and heat engines, and pneumatic works; the drainage of towns and the reclaiming of lands; the preparation of plans and specifications, and the proper selection and tests of the materials used in constructions. As a part of their instruction, students have frequent practice in the preparation of papers on subjects of professional importance.

An elementary course of lectures is given in engineering and mining economy, finance, and jurisprudence.

To meet the growing demand for special training, the five-year course has been arranged, allowing considerable option and diversity of studies to students wishing to pursue special lines of study in bridge architecture, or in railroad, mining, topographical, sanitary, geographical, electrical, or industrial engineering.

The five-year course also offers lines of continuous study of a historical, literary, and scientific character, which may alternate with the prescribed studies, and with architecture, general science, and technology.

As stated elsewhere, students in these courses are required to write essays upon professional subjects.

EQUIPMENT.

The special library of the department possesses many valuable works, among them the extensive publications recently presented to it by the French government; and in addition, the resources of the general library are available for the purposes of the department. The engineering laboratories contain various machines, models, and appliances for engineering investigations.

The engineering museums contain the following collections, which receive regular additions from a yearly appropriation:

1. The Muret collection of models in descriptive geometry and stone-cutting.

2. The De Lagrave general and special models in topography, geognosy, and engineering.

3. A nearly complete collection of the Schroeder models in descriptive geometry and stone-cutting, with some of the Olivier models, and others made at the University.

4. The Grund collections of bridge and track details, roofs, and trusses, supplemented by similar models by Schroeder and other makers.

5. A complete railroad bridge of one-hundred-foot span, the model being one-fourth of the natural scale.

6. The Digeon collection of working models in hydraulic engineering.

7. Several collections of European photographs of engineering works during the process of construction; and many other photographs, diagrams, and models.

8. Instruments of precision for astronomical work: a Troughton & Simms' transit, a universal instrument by the same makers

reading to single seconds, three sextants, two astronomical clocks, chronographs, chronometers, two small equatorials, the larger of four and a half inch aperture, made by Alvan Clark, and other instruments necessary to the equipment of a training observatory.

9. For geodetic work, a secondary base-line apparatus, made under the direction of the Coast and Geodetic Survey, and all the portable astronomical and field instruments needed, including sounding machines, deep-water thermometers, heliotropes, etc.

10. Among the coarser field instruments nearly every variety of engineers' transits, theodolites, levels, compasses, omnimeters, and tacheometers, with a large number of special instruments, such as planimeters, pantographs, elliptographs, arithmometers, tachometers, pocket altazimuths and sextants, hypsometers, and meteorological instruments of all descriptions.

For the Course in Civil Engineering see page 62.

Instructors: Professor Fuertes and Assistant Professors Church, Crandall and Marx.

ELECTRICAL ENGINEERING.

The rapid development of the applications of electricity has created a demand for thoroughly trained engineers conversant with electrical science, especially by companies carrying on telegraphy, electrical lighting, electrical supply and transmission of power, electroplating, or the manufacture of electrical machinery and apparatus. Recognizing this demand, at the beginning of the academic year 1883–4, the trustees of Cornell University began to receive students desiring to fit themselves to enter this new and constantly extending field. While the general studies of the new course are mainly those of the departments of Civil and Mechanical Engineering, the special studies of the course embrace the theory of electricity, the construction and testing of telegraph lines, cables, and instruments, and of dynamo-machines, and the methods of electrical measurements, electrical lighting, and the electrical transmission of power.

EQUIPMENT.

The University possesses a very extensive collection of electrical apparatus, including resistance coils, galvanometers, condensers, and other apparatus for measurements, from Elliott Brothers of London, Siemens & Halske of Berlin, and other makers; the special instruments by Deprez, Siemens & Halske,

Professors Ayrton and Perry, and Sir William Thompson, for measuring the currents and potentials of dynamo-machines; two large and several small dynamo-machines; electric lamps of several makers; telegraph and telephone instruments; besides magnetometers, dynamometers for measuring power used in driving dynamos, photometers, and other accessory apparatus. Telegraph and telephone lines are available for making tests, and electric light circuits upon the University grounds enable the student to make his experiments under the conditions that obtain in actual practice.

In the new Physical Laboratory every facility is provided for the use of electrical apparatus under the most favorable conditions, and a workshop attached to the laboratory provides for the construction of special instruments for investigations.

For the Course in Electrical Engineering see page 61.

Instructors: Professor Anthony and Assistant Professor Moler.

MARINE ENGINEERING.

At the request of the University, an officer of the engineer corps of the United States Navy has been detailed for the purpose of giving instruction in Marine Engineering. Special work in this subject, under the general direction of the department of mechanic arts, may therefore be taken by such students as desire it.

Such work will include the methods for determining the power necessary to secure a desired speed of ship, and the design of the machinery to supply and use that power, both in general plan and in detail. By means of lectures, students taking this work will be instructed as to the relative advantages of various types of machinery, the causes of deterioration and how to prevent them. The question of high steam pressures and rates of expansion is thoroughly discussed and the limitations both from a thermodynamic and commercial point of view are explained. Special attention is paid to the theory of the compound engine and to its design in practice.

A very complete and valuable set of blue print photographs of working drawings of marine machinery, presented to the Sibley College by the Harlan and Hollingsworth Co., of Wilmington, Del., as well as drawings of machinery of U. S. naval vessels, presented by Chief Engineer Alex. Henderson, U. S.

Navy, give excellent facilities for the study of the best practice in marine engine design.

Instructor: Assistant Professor McFarland.

MINING ENGINEERING.

Although no department of Mining Engineering has yet been formally established, all the main instruction required by a mining engineer is now given, as follows: the professor of civil engineering and his associates pay especial attention to the needs of those intending to connect themselves with the mining industries, giving lectures on tunneling and on the theory and practice of such constructions as are common to the professions of civil and mining engineer; the professor of mechanical engineering and his associates pursue a like course, giving instruction in mining machinery; the professors of general chemistry and mineralogy, and of analytical chemistry, give instruction in metallurgy, assaying, chemical analysis, and cognate subjects; the professors of geology and palæontology give instruction in the theory and classification of ores, and in those branches relating to chemical geology.

HISTORY AND POLITICAL SCIENCE.

I. HISTORY.

The aim in the courses of instruction in History is to present, in logical and chronological sequence:

1. *General History, Ancient, Mediæval and Modern*, with especial reference to the political and social development of the leading nations.

2. *The Constitutional History of England*, as that which has most strongly influenced our own.

3. *The Comparative Constitutional and Legislative History of various modern states*, as eliciting facts and principles of use in solving American problems.

4. *The History, Political, Social, and Constitutional, of the United States*, with a systematic effort to stimulate the student to original research into the sources of our national history.

5. *The Philosophy of History*, as shown by grouping the facts and thoughts elicited in these various courses.

I. General History.

The instruction in General History extends through the four years, as follows ;

1. General Ancient, Grecian, and Roman History, beginning with the spring term of the freshman year and continuing through the three terms of the sophomore year.

2. Mediæval History: General History of the social and political development of Europe during the Middle Ages, mainly by instruction in general English history during the sophomore year, and by special lectures in the junior year.

3. Modern History: (*a*) 1885–6, The history of Germany: fall term, the period of the Reformation; winter term, from the Reformation to the French Revolution; spring term, the nineteenth century. (*b*) 1883–4, The history of France: fall term, from the close of the Middle Ages to the French Revolution; winter term, the French Revolution; spring term, the Napoleonic and recent periods.

In connection with the above there are lectures on important points and periods in the history of other modern nations.

Instructors: President White, Professor C. K. Adams, and Assistant Professor Perkins.

2. English History.

The instruction in general English History is given by recitations from text-books during the entire sophomore year. This is supplemented by frequent lectures on those periods which are of the most importance and those that are more obscure and less fully treated in the text-book.

This is followed by courses of lectures to the upper classes on the growth and principles of the constitution, the aim being to present the great bases of law and policy on which the structure of the English government rests. The early Saxon institutions are described at some length; and the lectures follow the development of the system from this germ through its leading phases down to modern times. Special attention is paid, during the whole course, to such topics as illustrate the institutions and constitutional history of the United States.

Instructors: Professors Goldwin Smith and Tuttle, and Assistant Professor Perkins.

3. Comparative Constitutional and Legislative History.

This subject is treated, as far as possible, in the courses of lectures upon Modern History in the junior year, and in a special course of lectures during the senior year.

Instructors: President White and Professor C. K. Adams.

4. American History.

The study of American history extends through the junior and senior years, and for each of those years is a continuous subject. A post-graduate course is also organized, to which such seniors are admitted as have already had one year's work in this department.

Junior Section.—The junior section deals with American history from the earliest times to the end of the Revolutionary war. The subject is embraced in the following courses of lectures:

I. Prehistoric America, and the progress of geographical discovery in the western hemisphere from the earliest times to the present. II. European Rivals of the English in American colonization. III. The planting of the English colonies in America. IV. Colonial institutions and ideas,—political, social, educational, religious, industrial. V. Representative men of the colonial times. VI. The American revolution: its causes, progress, and results. VII. The American revolution as interpreted by contemporary American literature.

Senior Section.—The senior section deals with American history from the end of the Revolutionary war to the end of the Civil war. The subject is embraced in the following courses of lectures:

I. The history of the constitution in its origin, adoption, and amendments. II. The history of political parties. III. The presidential administrations from Washington to Lincoln, with especial reference to the principles regulating the civil service. IV. The anti-slavery movement, from its origin to its culmination in the civil war. V. Representative Americans of the nineteenth century. VI. Later phases of national progress and danger. (*a*) Territorial expansion. (*b*) Lessons from the census. (*c*) Improvement in the means of communication. (*d*) The Chinese in America. (*e*) The Indian problem. (*f*) The Negro problem. (*g*) History of Mormonism. (*h*) Illiteracy.

Senior-Graduate Section.—The senior-graduate section deals with American constitutional and political history.

Instructor: Professor Tyler.

5. PHILOSOPHY OF HISTORY.

The lectures on this subject are given in the winter term of the senior year. Their object is to trace the origin and progress of civilization, and to point out the causes and institutions, civil, social, and religious, which have tended to advance, or to retard its progress. The first half of the course treats of general principles, and the last, of the historic progress of civilization, beginning with the settlement of the Aryan nations in Europe.

Instructor: Professor Wilson.

II. POLITICAL AND SOCIAL SCIENCE.

The division includes the following topics:

1. *Political Economy and Finance.*
2. *Systematic Finance.*
3. *International Law.*
4. *American Law and Jurisprudence.*
5. *Social Science (special subjects).*

1. POLITICAL ECONOMY.

The instruction in Political Economy is given by lectures and recitations from text-books in the elements of the science during the winter term of the junior year; and by a course of lectures during the spring term of the senior year, in which practical questions arising in the study of industrial society receive attention. A course of lectures upon the science of finance, embracing a study of the comparative financial administration of constitutional nations and the various sources of public revenue, is given during the senior year. All these courses of lectures are to be supplemented by private reading.

Instructors: Professor Wilson and Associate Professor H. C. Adams.

2. SYSTEMATIC POLITICS.

The aim of the instruction in this course is to present both the philosophical and the practical side of the subject in a logical order of treatment. It comprises the two general topics of theoretical and practical politics.

Theoretical politics treats of primitive societies, the growth of states, forms of government, history of political literature and speculation, and the philosophy of the state. Practical politics treats of states in their concrete relations, and includes such sub-

jects as constitutional organization, legislation, administration and civil service methods, justice, revenue, military systems, and a comparative survey of existing governments. The historical and the analytical methods are both used, and the object of the course is to make the student acquainted in a scientific sense with the true principles of political organization and practice, as well as with the existing institutions of the great civilized states.

Instructor: Professor Tuttle.

3. International Law and Diplomacy.

The instruction in this department consists of a course of lectures given during the winter term of the senior year. The course treats, among other subjects, of the history and literature of the law of nations, rules of war, neutrality, prize, embassy, forms of diplomacy, history of American diplomacy, together with descriptions of some of the more famous international disputes in which the United States have been concerned.

Instructor: Professor Tuttle.

4. American Law and Jurisprudence.

The course consists of about forty lectures. The first three are devoted to the more general relations of man to government; then follow twelve lectures on the constitution of the United States, and five on the origin and development of international law; then lectures on the rights of persons and of property, with a general discussion of the nature of contracts, partnerships, and corporations; then lectures on crime and criminal law, and the course concludes with four lectures on the legal maxims relating to sovereignty, legislation, customary law, and the judiciary.

5. Social Science (Special Subjects).

This course is given during the spring term. It embraces instruction by lectures on the best methods arrived at in this country by the different States and in other countries in regard to legislative, administrative, and other dealings with pauperism in its various manifestations; crime in all its grades by reformatories, prisons and the like; inebriety in its different stages; insanity, whether chronic or acute; illiteracy, whether in city or rural populations; and in general with various subjects of the sort, which demand more intelligent treatment than, as a rule, they have yet received. To supplement such instructions, ob-

servations and investigations will be made by the students choosing this study under the direction of the instructor at various public institutions in Central New York,—nearly the whole range of charitable, reformatory, and punitory effort being represented at such institutions within a short distance of Ithaca.

It is hoped that, as years go on, young men graduated with the practical knowledge thus given, will, in the various professions, and especially in town councils, county boards, and State legislatures, prove of great value to the country by aiding to remove some of the serious evils which have arisen in creating and maintaining various institutions and administration.

Instructor: Mr. Sanborn.

For the Course in History and Political Science see page 70.

LANGUAGES.

1. THE ANCIENT CLASSICAL LANGUAGES.

Greek belongs to the course in Arts, and Latin to the courses in Arts, Literature, Philosophy, and History and Political Science. The distribution in regard to the number of years of required and optional study may be seen by consulting the tabulated statements of those courses. The number of weekly exercises with all undergraduate classes in Greek is three, and in Latin four, with the exceptions noted below. Instruction in Greek and Latin composition accompanies the study of the authors; lectures are occasionally substituted for recitations; and the examinations regularly comprise the translation of passages not previously seen by the student.

GREEK.

The Freshman Class.—The instruction during the first year is for the most part disciplinary in its methods, the purpose being on the one hand to enable any who may still be lacking in elementary knowledge to make up their deficiencies, and on the other hand to lay a good foundation of general principles. The first term especially is one of probation, a large share of the time is devoted to composition and memorizing, and no attempt is made to finish a stated amount of reading.

The Advanced Class.—With the Advanced Class, in which the prescribed work of the second year is combined with optional

work of the third and fourth years, a liberal method of instruction is pursued. It is assumed that the student knows his grammar and has a fair vocabulary at his command, and the main purpose is to cover as much ground of the best literature as can be done consistently with critical reading.

The course of reading is so arranged as not only to admit of no repetition during the four years through which a student may wish to continue the subject, but also to present a just distribution among the various branches of the literature, and as far as possible a natural order of sequence. The author read in the first term of the Freshman year is usually Xenophon, together with Anacreontics memorized for both oral and written practice; the second term, Homer, two or three books, with memorizing of selected passages; the third term, Aeschylus, the Prometheus, Persians, or Seven Against Thebes. For the second year the authors vary, according to a fixed principle, to suit the arrangement of classes explained above.

A table showing the whole course of reading in Greek may be had on application.

For graduate work in Greek see below.

Latin.

FRESHMAN YEAR.

Fall Term.—Livy.

Winter Term.—Cicero's De Senectute; the Odes of Horace (Book I).

Spring Term.—The Odes (Books II–IV) and Epodes of Horace.

SOPHOMORE YEAR.

Fall Term.—The Agricola and Germania of Tacitus; Roman antiquities.

Winter Term.—Terence; the Satires of Horace (Book I); the history of Roman literature (text-book and lectures).

Spring Term.—The Satires (Book II) and Epistles of Horace; the history of Roman literature.

JUNIOR YEAR.

Fall Term.—The Annals or the Histories of Tacitus: *two-hour optional course.* Cicero's Letters: *one-hour optional course.*

Winter Term.—Juvenal: *two-hour optional course.* Cicero's Letters: *one-hour optional course.*

SPRING TERM.—Catullus: *two-hour optional course.* Seneca *one-hour optional course.*

SENIOR YEAR.

FALL TERM.—Plautus: *two-hour optional course.* Quintilian: *one-hour optional course.*

WINTER TERM.—Lucretius: *two-hour optional course.* Virgil. Books IX and X of the Aeneid: *one-hour optional course.*

SPRING TERM.—The Letters of Pliny the Younger: *two-hour optional course.* Virgil, the Georgics: *one-hour optional course.*

A graduate class, working under the direction of the professors of Greek and Latin, meets at regular hours. The work of the present year is as follows:

In Greek, (once a week), first term, the Hellenic Orations of Demosthenes, discussion of rhetorical and rhythmical structure. Second term, Pindar, metrical readings and written translations. Third term, iambic verse composition.

In Latin, the critical reading of Livy (once a week); Latin Grammar, and methods of teaching (once a week).

For the course in Arts, which includes both Latin and Greek, see p. 53.

II. GERMANIC LANGUAGES.

The first two years in German are specially intended, besides preparing the student for progressive and independent work in the language, to give those who have not a classical training some grammatical discipline, and an insight into the growth and relations of Indo-Germanic speech. Instruction is also given to optional classes in the more advanced study of the Germanic languages.

GERMAN.

During the whole of the freshman year Whitney's Grammar and Reader are used, accompanied by Ahn's (Fischer's) exercises in writing German. In the fall term a knowledge of the inflections is gained, the strong verbs are begun, and stories and ballads are translated, with daily exercises in writing. In the winter term the strong verbs are completed, the syntax of nouns, the uses of the moods, and the arrangement of sentences are studied, with advanced translation and the writing of German. In the

spring term, with advanced translation and writing, exercises in translation at sight are also given, and the relation of English to German is traced by the application of Grimm's law, in connection with the special study of etymology.

In the fall term of the sophomore year one of Schiller's or Goethe's dramas is studied, followed in the winter term by extracts from Goethe's or Schiller's prose. In the winter term a course in scientific German is also offered, as an alternative. In the spring term Goethe's Hermann und Dorothea, Lessing's Minna von Barnhelm, or some similar work, is read. The work of the fall term is chiefly philological, while in the winter and spring terms more attention is paid to literary biography and reading at sight.

During the junior and senior years occur lectures and recitations, with optional classes, on German history, literature, and mythology, and courses are given varying from year to year, embracing the works of the leading authors. Classes are also formed in composition and conversation, and recent dramatic literature and the works of living novelists are read.

Other Germanic Languages.

Special instruction is offered in Gothic, Old Saxon, Old and Middle High German, and the Scandinavian and Netherland languages.

In Gothic, the text-books are Heyne's, Bernhardt's and Skeat's editions of Ulfilas and Braune's Grammar; in Old Saxon, the Heliand; in Old German, Otfrid's Krist, and Braune's Althochdeutsches Lesebuch, with lectures on the early German alliterative poetry and the later forms of German verse. In Middle High German the epic, lyric, and didactic poetry is studied, with the addition of prose selections. The Netherland languages are pursued with special reference to the explanation of English forms and idioms, and works in modern Dutch and Flemish are read.

The Scandinavian languages are taught chiefly by means of German text-books. In Icelandic, use is made of Wimmer's Altnordische Grammatik, and Vigfusson and Powell's Icelandic Prose Reader, and lectures are given on Scandinavian history and literature.

Instructors: Professors Hewett and H. S. White, and Mr. Krueger.

III. ROMANCE LANGUAGES.

French.

Joynes-Otto's Elementary French Course is studied during the fall term of the freshman year. Translation is begun in the same term and continued in connection with grammatical exercises throughout the year. The amount read is the equivalent of two of Bôcher's Modern French plays and Lacombe's Petite Histoire du Peuple Français. In the sophomore year two courses are offered, one in general literature, embracing both the modern and classical periods; and one in modern French, with special reference to its use in practical and scientific studies. In the first course are read such works as Mérimée's Colomba, Molière's Les Femmes Savantes, and Voltaire's Siècle de Louis XIV; one hour a week in the winter term is devoted to composition, and one in the spring term to conversation. In the second course are read such works as Garigue's Simples Lectures sur les Sciences, les Arts et l'Industrie, and the periodical, La Nature.

Optional courses are given during the junior and senior years in Old French and in recent literature and literary history.

Italian.

During the first year Ricci's Italian Principia is used with Lardelli's Letture Scelte and Manzoni's I Promessi Sposi. In the second year selections are read from Dante's Inferno, and from Boccaccio and Petrarch.

Spanish.

Knapp's Grammar of the Modern Spanish Language is used during the fall term; and Knapp's Modern Spanish Readings in the winter and spring terms.

Instructors: Professor Crane, and Messrs. S. J. and P. D. Brun.

IV. ORIENTAL LANGUAGES.

None of the languages here included are required for any baccalaureate degree conferred by the University. The Professor of Sanskrit and Living Asiatic Languages gives, in addition to special instruction, lectures bearing upon ethnographical philology and general linguistic science. Instruction is also given in the Hebrew language when it is desired.

Instructors: Professors Roehrig and Wilson.

MATHEMATICS AND ASTRONOMY.

The instruction offered by this department has a three-fold purpose: (1) To aid in developing certain powers and habits which every good citizen needs, whatever his vocation—the power and habit of precise definition, of sustained exact and independent reasoning, of clear statement of the grounds of his own convictions, and of successful application of theory to practice. (2) To present the fundamental relations of space and of number, and the structure of the system of worlds in which we live. (3) To meet the special needs of students in technical and scientific courses.

Every regular course, except natural history, includes geometry, algebra and trigonometry; the courses in architecture, mechanic arts, civil and electrical engineering, include analytic geometry and calculus; that in history and political science includes the theory of probabilities and statistics; most of the general scientific courses include analytic geometry and astronomy; and optional honor classes are formed for the solution of problems, etc. All these subjects, and the higher mathematical studies, are open as optionals or as extras to any one fitted to take them.

The "Course in Mathematics" [page 67] is designed to give a broad general training to those intending to be teachers and investigators. It therefore embodies more of literary work than is usual in scientific courses. About half of it consists of such mathematics, partly from French or German books, as forms a necessary introduction to modern investigations; while the rest consists of other scientific and literary studies, and of history or other optional work not mathematical.

To graduates and special students, instruction is also offered in the theory of numbers, quantics, and celestial mechanics. Large and constantly increasing facilities for special research are afforded by the University Library; which contains over 4,500 volumes on mathematics and the allied sciences, including many of the most important series of transactions and mathematical journals.

The frequent reviews, and the examinations on past or current work held during the term and at its close, are meant to test the student's command of general principles and methods as well as of details.

Instructors: Professors Oliver and Wait, Assistant Professor Jones and Mr. McMahon.

MECHANIC ARTS.

In 1870 the Hon. Hiram Sibley, of Rochester, N. Y., provided for the erection of a suitable building for the department of Mechanic Arts.

He also gave ten thousand dollars for increasing its equipment of tools, machines, etc., and soon after made a further gift of thirty thousand dollars for the endowment of the professorship of practical mechanics and machine construction.

During the years 1883 and 1884 he gave more than sixty thousand dollars for the purchase of models,—the extension of the present Sibley building, and the building and equipping of a complete set of workshops.

These comprise a foundry, a machine shop, a wood-working and pattern shop, a smithy, and mechanical laboratory. Adjoining these are a printing-office, a stereotype foundry, a boiler-house and janitor's quarters. These shops will be completed and ready for use by January, 1885.

The machine shop is supplied with lathes of various kinds, planers, grinding, drilling, and shaping machines, a universal milling machine, fitted for cutting plane, bevel and spiral gears, spiral cutters, and twist drills, with additional tools and attachments for graduating scales and circles and for working various forms and shapes.

In addition to the usual hand and lathe tools, there are instruments of the greatest accuracy consisting of standard surface-plates, straight-edges and squares of various sizes; a standard measuring machine reading to the ten-thousandth of an inch, a universal grinding machine for produciug true cylindrical and conical forms, and a set of Betts' standard gauges.

The foundry is equipped for giving thorough iustruction in loam and sand moulding, and the casting of iron and brass. The cupola for melting iron is a Colliau's improved, with a capacity of one ton per hour. There are also a crucible furnace for melting brass, a core oven, a rattler, and the other usual foundry appliances.

The smithy contains ten forges of the most approved pattern, and corresponding outfits of smith's tools. The instruction embraces forging, welding, tempering, etc.

The wood-working and pattern shop will be thoroughly equipped for teaching the use of all ordinary tools and machines for working wood. Particular attention will be paid to the details of pattern-making.

The mechanical laboratory will be devoted to making tests and experiments. The apparatus will consist of experimental engines and boilers, machines for testing the strength of materials, friction and lubricants, friction and transmitting dynamometer, etc., etc.

The scope of the work in this laboratory will be understood by the following illustrative list of experiments:—the determination of the horse power of engines, adjustment of indicator and rig, examination and adjustment of valve gear and link motion, determination of limiting speed from consideration of weight of reciprocating parts, balancing engine, determination of cost of power in coal and water per I. H. P. per hour, test of dryness of steam by calorimeter, value of non-conducting coverings of steam pipes, tests of efficiency and evaporative power of boiler. tests of steam pumps, injectors, etc., etc. Besides other apparatus to be purchased soon, the laboratory is now supplied with a 20-ton Riehlé testing machine, arranged for testing strength of materials by tension, compression, and transverse strain, Wood's steam gauge tester, Richardson's, Thompson's Crosby's and Tabor's indicators; Amsler's planimeter, revolution counters, steam gauges, injectors, inspirators, and safety valves; Blake's, Blakesley's, Deane's, Miller's, and Woodworth's steam pumps; Allen's, Chase's, Gardner's, Lynde's, Shive's, Waters', and Wright's governors.

In short, the aim of all the instruction in shop work is to make the student, as far as time will permit, acquainted with the most approved methods for the construction and inspection of machinery. Every student is required to devote nine hours per week to work in the shops, or about thirty days during each year.

The course of instruction in mechanical drawing is progressive, from geometrical drawing to designing of machinery and making complete working drawings. The aim is to familiarize the student with the methods adopted in the best drawing offices of the country. This end is furthered by working drawings and blue prints from our own most prominent engine and machine builders, whose practice is thus at once shown in the clearest way. Several hundred drawings selected from the best technical schools abroad also aid in this work.

The theoretical instruction in the department comprises a very thorough course in the kinematics of machinery after the Reuleaux's system, thermodynamics and the theory of steam, air, and gas engines, a critical examination of the valve gears in

general use and their design, and, in connection with the course in drawing, of the theory of machine design. To illustrate this work there are a complete collection of Reuleaux's kinematic models, Baldwin's link and valve motion model, and a large collection of brass, iron, and wooden models, illustrative of mechanical principles.

The Sibley College, a building 166 feet by 40 feet, and three stories high with basement, contains the lecture, recitation and drafting rooms of the department of Mechanic Arts, as well as rooms for the display of models aud drawings of machinery.

Instructors: Professors Morris, Webb, Assistant Professor McFarland and Mr. Clinton.

For the Course in Mechanics see p. 66.

MILITARY SCIENCE.

Pursuant to the act of Congress creating the land grant on which the Cornell University is founded, and the act of the legislature of the State of New York assigning that land grant, instruction is provided in Tactics and Military Science. Drill and Military Science are "a part of the studies and exercises in all courses of study and in the requirements of all students in the University" during the fall and spring terms of the freshman and sophomore years and the winter term of the senior year. Foreigners, laboring students, and those physically unfitted therefor are excused from drill. Students are required to provide themselves with the University uniform, unless excused on account of inability to procure it, and they are held accountable for loss or injury to the arms and other public property issued to them.

The course extends through the fall and spring terms of the first two years, and the winter term of the senior year. During the first two years there are three exercises a week, of an hour each; those of the senior year consist of a regular course of lectures on the general operations and science of war, twice a week.

The subjects treated are: *The Art of War.*—To comprise the history and principles of grand and minor tactics; the organization of armies, with some account of the administrative arrangements of our own army; strategy, with historical illustrations; and accessory operations of war. *Military Engineering.*—To comprise the principles of military topography; the effect of

projectiles; the principles of fortification, with their application to field works; military mining; the attack and defense of works; and the construction of military roads and bridges. *Military Law.*—To comprise the origin, principles, and limitations of military law; the nature and force of the articles of war and the general regulations for the army; a summary of the rules of evidence; the constitution, jurisdiction, and procedure of courts-martial, courts of inquiry, military commissions, and military boards.

Any student who has satisfactorily performed all the duties required for the first two years, and who is qualified therefor, may be selected for the place of a commissioned officer if needed. For the performance of his duties as a commissioned officer in the junior or senior year he is entitled to a credit of three recitations a week for each term; and, at graduation, he may receive a certificate of military proficiency with his diploma.

The practical military exercises include: *Infantry Tactics.*—To comprise the schools of the soldier, company, and battalion; with skirmishing, the forms of parade, and the duties of guards. *Artillery Practice.*—To comprise at least the school of the piece and section for the field guns, with such further artillery instruction as may be found practicable. *Special Exercises.*—To comprise recitations at such times as may be prescribed.

Instructor: Professor Schuyler.

NATURAL HISTORY.

I. BOTANY.

The following courses of instruction are offered:

1. *Elements of Botany.*—Designed as a course for general students, and as an introductory course for special students; twenty lectures and twenty hours of work in the laboratory in the study of structure and the determination of species. Counts three hours per week in the spring term.

2. *Field Work.*—Consists of the collection, determination, pressing and mounting of not less than fifty species, to count two hours per week. Additional time is allowed for additional work.

3. *Compositæ and Gramineæ.*—Consists of a study of these two orders in regard to their structure, affinities, distribution and uses. Twelve lectures with sixty hours of laboratory work, to count as three hours in the fall term.

4. *Systematic and Economic Botany.*—A study of the principles of classification, with a somewhat critical study of several of the more important natural orders. Thirty lectures to count as three hours per week in the winter term. This course is given once in two years, alternating with (6).

5. *Vegetable Histology.*—Consists of the study of the minute structure of plants. A systematic course of laboratory work, with introductory lectures, counting two hours per week in the winter term.

6. *Vegetable Physiology.*—A course of thirty lectures in the winter term, counting three hours per week. Given once in two years, and alternating with (4).

7. *Higher Cryptogams.*—A course of laboratory work with introductory lectures. Two hours per week in the spring term.

8. *Lower Cryptogams.*—An outline study of the whole group, with a more special study of fungi. Twenty-five lectures, with sixty hours of laboratory work, counting four hours per week in the fall term.

9. *Principles of Plant-culture.*—A study of plants with reference to their adaptation to cultivation, the changes produced by culture, and the origin and characteristics of artificial varieties. Twenty-five lectures in the fall term, counting two hours per week. This course is offered once in two years, alternating with (10).

10. *Arboriculture and Forestry.*—A course of lectures with reading and special association work, counting two hours per week in the fall term. Offered once in two years, alternating with (9).

11. *Woody Plants.*—A field study of the woody plants of the flora of Cayuga Lake valley, with determination of species, and the preparation and mounting of specimens. Not less than fifty species to count two hours per week for the spring term.

The instruction as indicated above need not be followed in the order named. In some cases, however, the course must be preceded by one or more of the other courses, and in all cases (1) must be taken first.

In addition to the above instruction, special work will be offered to students who have taken the whole or a large share of the foregoing courses, and who show a sufficient preparation for such work.

Herbarium and Apparatus.

The means of illustrating the instruction in Botany include the Herbarium, estimated to contain fifteen thousand species; two series of models, the Auzoux and the Brendel; the full set of wall maps of Achille Comte, and the botanical charts of Professor Henslow; a lime lantern with five hundred views, illustrating different departments of Botany; twenty compound and dissecting microscopes; a collection of fruits, barks, cones, nuts, seeds, fibers, and various dry and alcoholic specimens; a general collection of economic vegetable products, and above a thousand specimens of the woods of different countries. Besides these, the large conservatories and gardens, and an uncommonly rich native flora afford abundant material for illustration and laboratory work.

Special students in agriculture, not candidates for a degree, are received for one, two or three years. Such students must devote at least two-thirds of their time to studies immediately connected with agriculture.

Instructors: Professor Prentiss and Assistant Professor Dudley.

II. GEOLOGY AND LITHOLOGY.

Instruction is given in general and economic geology and lithology by means of lectures, laboratory practice, and field work. The lectures consist of a course on general geology in the fall term, and a course on economic geology in the winter term.

The laboratory work consists of a progressive series of exercises in determinative lithology, for which at least one term of previous work in the mineralogical laboratory is desirable; and of exercises in the preparation of geological sections and maps from the data furnished by government reports and by study in the field. During the fall and spring terms there are frequent excursions to points of geological interest and instruction is given in field work.

To advanced students, opportunities are offered for the microscopic investigation of minerals and rocks, and for the extended study of important mineral districts, with the preparation of reports thereon and discussions of the metallurgical methods and appliances adapted to their products. The rocks of Ithaca and its neighborhood afford ample material for study and original research.

LABORATORY.

The laboratory is well furnished with the appliances needful for successful study. Among other things, it has numerous maps, wall tablets, engravings of geological objects, and magic-lantern slides. Large and important additions have also beeu made during the past year to the lithological and stratigraphical collections.

Instructor: Professor S. G. Williams.

III. PALÆONTOLOGY.

Instruction is given as follows: by laboratory work throughout the year; by excursions during the fall and spring terms to the rich fossiliferous localities in and about Ithaca; and by lectures on systematic palæontology in the winter term.

The elementary work comprises the observation and recording of facts, the collecting of material in the field, the critical study of the literature, and the classification in the laboratory of invertebrate fossils from all parts of the world.

Exceptional facilities are offered for advanced work in the interpretation of fossil forms as marks of geological age and sequence; in the study of faunas, their conditions and distribution; and in the critical study of species and genera, their characters, relations, and modifications as exhibited in the faunas and floras of the past.

MUSEUM OF PALÆONTOLOGY.

The museum comprises the following collections:

1. The JEWETT COLLECTION, accumulated by the late Col. Jewett when curator of the State Cabinet of Natural History. This collection is especially rich in New York fossils, containing many of the original specimens described in the State reports, and not a few unique specimens.

2. A fair representation of the rich faunas of the cretaceous and tertiary formations along the eastern and southern parts of the Union, and a large number of characteristic English and European fossils.

3. A fine series of English mesozoic fossils; of tertiary fossils from Santo Domingo; of pre-glacial fossils from Sweden; and numerous smaller collections from various typical localities in our own country.

4. The Ward series of casts.

5. The unique collections from Brazil, made by Prof. Hartt and party on the Morgan expedition, containing the original specimens; and a great number of duplicates.

Numerous additions have been made during the past year making the museum more complete in ichthyosauri and other vertebrate remains, in Trenton trilobites, and in the fauna of the Upper Devonian.

Instructor: Professor H. S. Williams.

IV. VERTEBRATE ZOOLOGY.

The title likewise includes Human Physiology and Hygiene, Microscopy, and Comparative Anatomy. The instruction is by lectures, demonstrations, laboratory practice, and field work, as follows:

1. *Hygiene.*—Early in the fall term are given six lectures upon the personal care of health, and upon emergencies. Among other practical matters students are shown how to check bleeding, and how to practice the best methods for resuscitating the drowned.

2. *Human Physiology.*—The thirty-six lectures treat chiefly of the subjects not included in the entrance examination, the cellular structure of the body, the phenomena of nervous and muscular action, the vaso-motor system, and the structure and functions of the brain. They are illustrated by a life-sized manikin and other models, by numerous anatomical preparations, by diagrams, and by painless experiments upon the frog and cat. Each student also examines, through the microscope, about thirty preparations of the tissues, including the living amœba, cilia in action, and the circulation in the frog's foot and necturus' gill.

3. *General Vertebrate Zoölogy.*—At one-third of the thirty-six exercises the student examines and dissects representative forms, including branchiostoma, lamprey, shark, perch, catfish, necturus, frog, turtle, fowl and cat. The lectures are illustrated by a full set of Auzoux models, by diagrams, and by the free use of the zoölogical collections.

4. *The Brain.*—A course of twenty lectures is devoted to the anatomy of the brain, human and comparative. Practical work is done both in dissecting and in examining the literature of the subject.

5. *Anatomical, Microscopical, and Physiological Technology.*—The forty lectures upon these subjects are accompanied by practical demonstrations of all the methods presented, and these methods are employed by the student in the laboratory.

Laboratory Practice.—This varies with the needs of the student and the extent of his preparation. Usually, as a basis for other work, the skeletons of man and the domestic cat are studied, and some of the bones are drawn and described by the student. He then dissects some of the muscles, vessels, and nerves. In the winter term, the methods of microscopical manipulations are learned, and the tissues of the cat, frog, and necturus are examined. In the spring term the student examines the brain, heart, and other viscera of the cat, and performs for himself the simpler physiological experiments. Ordinarily, laboratory work can be commenced only at the beginning of the year, and the student must have had instruction in drawing.

After the first year the student, according to his purposes, dissects other vertebrate animals, or human subjects. There are special facilities for the study of the brain, heart, and early stages of development.

Field Work.—During the fall and spring terms the students are occasionally accompanied by their instructors to the field or lake in order to observe living animals, and to learn the methods of their capture and preservation.

Museum.—The vertebrate collections are as follows: About thirty-five hundred examples of about twenty-four hundred species of entire animals in alchohol. Nearly half of the specimens are fishes collected in Brazil by the late Prof. C. F. Hartt; the remainder include series of named fishes from the Smithsonian Institution and the Museum of Comparative Zoölogy, representatives of the general North American fauna, and of the local fauna, and rare forms from various parts of the world. Among the last are the following: Chimpanzee, orang, dingo, pangolin, sloth, ant-eater, armadillo, ornithorhynchus, echidna, jacana, sphenodon, monitor, heloderma, crocodile, alligator, draco, axolotl, proteus, megalobatrachus, siren, amphiuma, pipa, ceratodus, protopterus, flying-fish, polypterus, calamoichthys, thalassophryne, chimæra, cestracion, myxine, bdellostoma, and branchiostoma.

About twenty-eight hundred anatomical preparations, including mounted skeletons of man, gorilla, lion, panther, camel, porpoise, sloth, kangaroo, ostrich, apteryx, alligator, draco, frog, cryp-

tobranchus, necturus, cæcilia, and amia; more than six hundred preparations of the brain; large series of dissections of the lamprey, necturus and cat; embryos or young of man, ape, leopard, opossum, kangaroo, manatee, dugong, peccary, lama, sea-lion, bat, alligator, necturus, amia, lepidosteus, shark, skate, and domesticated animals.

About eight hundred microscopical preparations, chiefly from the cat, frog, and necturus.

More than one thousand mounted skins, including orang, tiger, otter, moose, camel, beaver, hyrax, centetes, galeopithecus, armadillo, porpoise, koala, wombat, kangaroo, echidna, ornithorhynchus, emeu, apteryx, boat-bill, penguin, gavial, crocodile, rattlesnake, heloderma, megalobatrachus, ceratodus, cestracion, saw-fish, gar-pike, polypterus, etc.

Besides the papier mâché models by Auzoux mentioned above there are several Bock-Steger models in plaster, a Buechi model of the brain, and wax models by Weisker as follows: the brain cavities, the pelvis, the diaphragm, the development of the frog, trout and branchiostoma.

In the arrangement of the collections reference has been had to the exemplification of zoological and morphological ideas, as the unity of general structure under diversity of form and mode of life in the branch and within each class, the resemblances between members of different classes, the existence of apparently useless organs, etc. Among special series are placed together the vertebrates inhabiting the neighborhood, all venomous forms, etc.

Instructors: Professor Wilder and Assistant Professor Gage.

V. ENTOMOLOGY AND GENERAL INVERTEBRATE ZOOLOGY.

Owing to the economic importance of the study of insects, and to the difficulties attending a thorough study at a distance from the sea-shore of any group of marine animals, more attention is given to entomology than to any other division of invertebrate zoölogy.

General Zoölogy of Invertebrates.

There are three exercises per week during the fall term. Two of these are lectures; and the third consists of an examination by the students of specimens illustrating the subjects discussed in the lectures. At these practical exercises the minute forms of animal life are examined microscopically; and each stu-

dent dissects specimens of the larger typical invertebrates, including squid, clam, ascidian, gephyrea, starfish, sea-urchin, crayfish, and grasshopper.

Those students who wish to pursue the subject farther, after taking the above course, are admitted to the laboratory. Here the greater part of the work indicated in Brooks' Handbook of Invertebrate Zoölogy is performed as a basis for more advanced study. From this point the work varies with the needs of the student. The laboratory is open during the fall and spring terms.

Entomology.

In addition to the course on economic entomology described on page 75, there are special facilities for advanced work in systematic entomology, insect anatomy, and the study of the life-histories of insects. The entomological laboratory is open during the fall and spring terms and the summer vacation.

Summer Course in Entomology.—During the summer vacation a course of instruction will be given in entomology, including both laboratory and field work. Any one not already a member of the University desiring to join this class should make application to the Professor of Entomology as early as June 10th. The attention of such persons is called to the rule respecting the admission of special students without examination, and to the fact that tuition is free to college graduates.

Collections of Invertebrates.—1. The general collection of invertebrates comprises a small but well selected series of forms representing all of the larger groups. In this collection there is a nearly complete set of the duplicates distributed by the U. S. National Museum, many specimens collected on the coast of Brazil by the late Professor C. F. Hartt, and specimens from Florida and the West Indies, collected by Dr. Wesley Newcomb.

2. The Newcomb collection of shells embraces more than eighty thousand examples of more than twenty thousand varieties, representing at least fifteen thousand species.

3. There is in the collection a set of the Auzoux models, and of the glass models made by Blaschka.

4. The biological and systematic collections of insects are described elsewhere under the general head Agriculture.

For the Course in Natural History see page 68.

Instructor: Professor Comstock.

VI. PRELIMINARY MEDICAL EDUCATION.

There is no medical department in the University, but special facilities are afforded those who wish their course to be of direct use in the study of medicine.

The Faculty believe that the crowded and difficult curricula of the medical schools should be preceded, when possible, both by a broad general education, and by a special and practical training in certain branches. They therefore strongly advise those who intend to become physicians to pursue some one of the full courses, and then to become resident graduates, reviewing physiology and chemistry, attending the lectures in veterinary science, and taking laboratory work in chemistry and anatomy.

When only four years are available, the courses in Natural History, Science, and Science and Letters afford more or less time for laboratory work, especially in the senior year.

In case the student can remain but two years, he is advised to take the two-year Course Preparatory to the Study of Medicine, which embraces the branches best calculated to serve as the basis of a proper medical education.

Finally, special students are received for a shorter period than two years, if fitted to undertake the lectures and laboratory work.

For the Course Preparatory to the Study of Medicine see page 70.

PHILOSOPHY AND LETTERS.

LITERATURE.

English Literature, and Rhetoric and General Literature, form a part of each of the general courses of study, either as required or as optional work, the matter being distributed as shown in the tabulated statements of those courses.

1. *ANGLO-SAXON AND ENGLISH LITERATURE.*

SPECIAL COURSE.

SOPHOMORE YEAR.

FALL and WINTER TERMS.—Anglo-Saxon grammar, the A.-S. Version of the Gospel according to St. John, and selections from the Homilies of Ælfric.

SPRING TERM.—Selections from King Alfred's A.-S. Version of the History of Paulus Orosius, and of Boethius De Consolatione Philosophiæ, and selections from the A.-S. Chronicle.

JUNIOR YEAR.

FALL TERM.—Chaucer's Canterbury Tales, with lectures on the English of the XIIth to the XIVth centuries.

WINTER TERM.—Elizabethan English, on the basis of selected plays of Shakespeare.

SPRING TERM.— Hales' longer English poems (from Spenser to Shelley).

SENIOR YEAR.

FALL and WINTER TERMS.—Lectures on Shakespeare and cotemporary dramatists.

SPRING TERM.—Reading by the professor, from XIXth century literature.

GENERAL COURSE.

JUNIOR YEAR.

FALL TERM.—Lectures on English literature, from Chaucer to Shakespeare, inclusive.

WINTER TERM.—Lectures on English literature, from Milton to Cowper, inclusive.

SPRING TERM.—Lectures on English literature of the nineteenth century.

A syllabus of the course, prepared by the professor, presents to the student the leading points of each lecture, and the order of their treatment, designates the best editions of an author's works, or parts of them, that are generally accessible, and guides the student to such sources, philological, historical, biographical, critical, etc., as enable him to read to the best advantage.

Three lectures a week are given throughout the year.

It is sometimes found advisable to depart from the chronological order, and to begin with the lectures of the winter term, as given above, or of the spring term.

II. RHETORIC, GENERAL LITERATURE, AND ORATORY.

The course in rhetoric, general literature, and oratory extends through the four years.

The work of the freshman year embraces the principles of elementary rhetoric, including diction, the properties of the sentence, the structure of paragraphs, figures of speech, and the history and elements of the English language. In addition to recitations on the topics discussed, each student every week prepares a written exercise.

The sophomore year takes up the study of narration and description, and includes the writing of essays, which, after correction, are returned to the student to be rewritten. Elocution and exercises in declamation are optional during the winter and spring terms.

The junior year includes exposition and advanced rhetoric. Original themes and orations are delivered before the class, after private criticism by the professor. During the spring term, lectures are given on oratory and orators, the themes and orations being on related topics.

The senior year continues the delivery of themes and orations and takes up the study of general literature, which is taught entirely by lectures and collateral reading. The lectures are on topics connected with the history of literature, its different periods, and the leading representative essayists and orators. Optional classes are formed for the special study of Shakespeare, Demosthenes, and the masters of English prose style, and for practice in oral discussion and extempore speaking.

MORAL AND INTELLECTUAL PHILOSOPHY.

Instruction in Philosophy begins in the fall term of the junior year. During that term it comprises a study of the physiology of the nervous system in relation to mental phenomena, and the nature and origin of knowledge; and during the winter term, the study of moral philosophy, theories of morals, and the development of moral sentiments. In the spring term the subject is logic, including the laws of thought, the formulæ of reasoning, and the various methods of proof and refutation, together with the methods of investigation and the grounds of certainty.

The subject during the fall term of the senior year is the history of philosophy, and the progress of knowledge from its beginning in Greece to the present day, with criticisms on the methods of philosophy and transcendental logic.

THE UNIVERSITY LIBRARY.

The Library contains about fifty-one thousand two hundred volumes, besides fifteen thousand pamphlets. It is made up chiefly of the following collections, increased by annual additions of from three thousand to five thousand volumes: a selection of about five thousand volumes purchased in Europe in 1868, embracing works illustrative of agriculture, the mechanic arts, chemistry, engineering, the natural sciences, physiology, and veterinary surgery; THE ANTHON LIBRARY, of nearly seven thousand volumes, consisting of the collection made by the late Professor Charles Anthon, of Columbia College, in the ancient classical languages and literatures, besides works in history and general literature; THE BOPP LIBRARY, of about twenty-five hundred volumes, being the collection of the late Professor Franz Bopp, of the University of Berlin, relating to the oriental languages and literatures, and comparative philology; THE GOLDWIN SMITH LIBRARY, of thirty-five hundred volumes, presented to the University in 1869 by Professor Goldwin Smith, comprising chiefly historical works, and editions of the English and ancient classics—increased during later years by the continued liberality of the donor; the publications of the Patent Office of Great Britain, about three thousand volumes, of great importance to the student in technology and to scientific investigators; THE WHITE ARCHITECTURAL LIBRARY, a collection of over a thousand volumes relating to architecture and kindred branches of science, given by President White; THE KELLY MATHEMATICAL LIBRARY, comprising eighteen hundred volumes and seven hundred tracts, presented by the late Hon. William Kelly, of Rhinebeck; THE CORNELL AGRICULTURAL LIBRARY, bought by the Hon. Ezra Cornell, chiefly in 1868; THE SPARKS LIBRARY, being the library of Jared Sparks, the late president of Harvard University, consisting of upwards of five thousand volumes and four thousand pam-

phlets, relating chiefly to the history of America; THE MAY COLLECTION, relating to the history of slavery and anti-slavery, the nucleus of which was formed by the gift of the library of the late Rev. Samuel J. May, of Syracuse.

The Library is a circulating one so far as the members of the Faculty are concerned, and a library of reference for students. Undergraduates have free access to a collection of cyclopædias, dictionaries, and works of reference in the various departments of study, but they apply to the librarian for other works desired. Graduate students are admitted to the alcoves. And, upon the recommendation of the professor in any department, students of the senior and junior classes, engaged in special work in that department, will be granted access to the shelves for purposes of consultation.

The Library is managed by a body known as the LIBRARY COUNCIL, which consists of seven members, as follows: The President of the University and the acting Librarian, *ex officio*, one trustee chosen by the Board, and four professors nominated by the Faculty and confirmed by the Board. The President of the University is *ex officio* chairman of the council. The elected members hold office one year.

By the will of Mrs. Jenny McGraw Fiske, who died in October, 1881, the Library received a specific bequest and was also made residuary legatee. From this source there has been paid to the University up to the present time about $700,000; and the income from this fund, known as the McGraw Library Fund, when it becomes available will be applied to the support and increase of the Library.

THE LIBRARY, a bulletin, is issued at intervals and contains classified lists of recent accessions, and of books in various departments, as well as other bibliographical matter intended to assist students in their use of the Library.

THE MUSEUM OF NATURAL HISTORY.

The Museum of Natural History includes the collections in American archæology, botany, conchology, entomology, geology, ornithology, palæontology, veterinary science, and zoölogy. Except in botany, entomology, and veterinary science, the collections are deposited in the McGraw building. Some account of the several collections is to be found under the titles of the respective departments. Large additions have been made during the past year, and still larger ones are anticipated.

The Museum is managed by a body known as the COUNCIL OF THE MUSEUM OF NATURAL HISTORY, which consists of the President of the University, the members of the special faculty of Natural History, and the curator of the collection in American archæology, *ex officio*, and one trustee chosen by the Board, to hold office one year.

THE McGRAW-FISKE HOSPITAL.

In the year 1881, the sum of forty thousand dollars was bequeathed by Mrs. Jenny McGraw Fiske as a provision for the care of students who may fall ill during their attendance at the University. It is proposed that a portion of this sum shall be devoted to the erection of a cottage hospital, made comfortable and attractive, and thoroughly equipped in all respects; and that a trained nurse be attached to it, who shall be ready to give attention the moment it may be needed. The carrying out of the intention of the founder is at present delayed by legal proceedings.

PRIZES AND HONORS.

PRIZES.

No student is allowed to be a competitor for any of the following prizes who has not satisfactorily passed all his examinations for the terms preceding that in which he offers himself as a competitor. Nor will the prizes be awarded to any one who so far neglects his other studies as to fail to pass any of his required examinations at the close of the term in which the competition takes place.

1. The Woodford Prize.

A gold medal of the value of *One Hundred Dollars*, founded by the Honorable Stewart Lyndon Woodford, late Lieutenant-Governor of the State of New York, will be given annually for the best English Oration, taking into account both matter and manner.

The subjects for the Woodford prize the present year are as follows:

1. William H. Seward's Place among American Statesmen.
2. "History teaches wise men to put trust in ideas, not in circumstances."
3. The Pyramids and the Suez Canal as Records of two different Eras.
4. Modern Civilization in its Bearing upon the Workingman.
5. The Growth of Religious Toleration in the United States.
6. "O Julius Cæsar, thou art mighty yet,
   Thy spirit walks abroad."
7. The Hessians in the American Revolution.
8. Plutocracy in Modern Societies.
9. The Puritan Epoch in New England.
10. The Assimilating Power of the American Nation.

2. The Horace K. White Prizes.

Established by Horace K. White, Esq., of Syracuse. To the most meritorious student in Veterinary Science, *Twenty Dollars;* to the second in merit, *Ten Dollars.*

3. Sibley Prizes in Mechanic Arts.

Under the gift of the Hon. Hiram Sibley, made in 1884, the sum of $100.00 will be annually awarded to those students in the Sibley College of Mechanic Arts who shall in the opinion of the Faculty of that institution show the greatest merit in their college work.

HONORS.

I. Honors at Graduation for General Excellence.

Honors will be granted at graduation to students whose general average in the studies required in their course is honorable.* These honors will be known as *honors for general excellence*, and will be recorded upon the commencement programme, and in the Register of the year following.

II. Honors for Distinguished Excellence in Special Subjects.

Honors will be granted (subject to conditions stated below) for distinguished excellence in any of the following subjects: history, political science, French, German, Greek, Latin, mathematics, chemistry, physics, entomology.

These honors will be conferred by the Faculty, upon the recommendation of the department concerned. They will be known as *special honors in* ——. They will be recorded in the Register of the year following, and *final honors* will also be announced upon the commencement programme of the year in which they are conferred.

Students who desire to be admitted as candidates for these honors must give notice in writing to the Registrar within fourteen days after the day of registration of the spring term. The special examinations for honors will be held in May.

These special examinations will be of two kinds: in certain departments, there will be but a single examination, which will

* In the usage of the University, the word "honorable" denotes the highest grade of standing; the word "creditable" denotes the next lower grade.

be open to seniors and graduates. In certain other departments there will be, in addition to this, another examination preliminary to the final one, to be known as the mid-course examination, and to be open to sophomores and juniors, and to seniors who intend to be candidates for final honors after graduation.

Graduates of other colleges studying in Cornell University may, by vote of the Faculty, be admitted to become candidates for these honors.

General Requirements.

In order to become a candidate for these honors, the student must satisfy the following requirements:

1. He must have completed all the studies required in his course up to the beginning of the term in which the special examinations are held.

2. At the beginning of the term in which the special examinations are held, his average for his entire work in the studies of his course, exclusive of those in the department in which he seeks for honors, must be creditable.

3. His average for his entire work in the department in which he seeks for honors, up to the beginning of the term in which the special examinations are held, must be honorable.

4. If the department be one in which a mid-course examination is given, the applicant for final honors must have won the mid-course honors.

The candidate must pass with distinguished excellence a special examination upon subjects to be announced in advance, and present any thesis or undergo any other test that may be required of him.

Honors in special subjects will not be granted to a student whose work is unsatisfactory in any of the studies of his course during the term in which the special examinations are held. Nor will they be granted to any but registered students who are pursuing the number of studies required for the term.

The special requirements will be as follows:

Mid-course Honors.

History; Political Science.—The candidate must have passed, with an honorable average, the required work in Grecian, Roman, and English history, and must pass, with distinguished excel-

lence, a special examination upon a subject to be announced in advance.

The subject for 1885 is either of the following, at the option of the candidate:

(*a*) In Modern European History: Reformers before the Reformation.

(*b*) In English History: The reign of Elizabeth.

French; German.—The candidate must have passed, with an honorable average, the required work of the freshman and sophomore years, and must also pass, with distinguished excellence, a special examination upon the following subjects:

(*a*) Translation at sight from French or German.

(*b*) Translation from English into French or German.

(*c*) Translation from specified French or German authors.

The subjects for 1885 are, in French: Corneille, Cinna; Molière, L'Avare, and les Fourberies de Scapin; About, Les Jumeaux de l'Hotel Corneille, Madame de Duras, Ourika.

In German: Lessing's Laokoon, xxv chapters (omitting notes) Clarendon Press edition; Schiller's Wallenstein's Tod; Goethe's Leiden des Jungen Werthers.

Greek; Latin.—The candidate must have passed, with an honorable average, the required work of the freshman and sophomore years, together with the courses in Grecian and Roman history; and must also pass, with distinguished excellence, a special examination upon the following subjects:

(*a*) Translation at sight from the easier Greek or Latin authors.

(*b*) Translation from English into Greek or Latin.

(*c*) Translation of passages from specified Greek or Latin authors.

The subjects for 1885 are, in Latin: Virgil's Aeneid, Books IX and X; Livy, Book XXII. In Greek: Plato's Apology, and Books IX–XII of Homer's Odyssey.

Mathematics.—The candidate must have passed, with an honorable average, the required work of the freshman and sophomore years of the course in mathematics, with the exception of the subjects of descriptive geometry and mathematical essays, and must also pass, with distinguished excellence, a special examination upon the following subjects:

(*a*) The solving of geometric problems.

(*b*) Modern geometry and conic sections.

(*c*) Algebra, including the theory of equations and the elements of determinants.

(*d*) Plane trigonometry.

University instruction, covering many of the topics required for this examination, is given to extra classes for two hours a week through the freshman and sophomore years, and candidates for mid-course honors are advised to join these classes.

FINAL HONORS.

History; Political Science.—The candidate must be in full and regular standing in the Course in History and Political Science, in Arts, in Literature or Philosophy, with an honorable average in the special studies of that course, and must have won mid-course honors. He must also write a satisfactory thesis upon a subject specified in advance, and pass, with distinguished excellence, a special examination upon that subject.

The subject for 1885 is either of the following, at the option of the candidate:

(*a*) In American History: Von Holst's Constitutional History of the United States.

(*b*) In Modern European History: The political development of Germany in the nineteenth century.

For 1886:

(*a*) In American History: England's commercial restrictions upon the colonies prior to the Stamp Act.

(*b*) In Modern European History: The building up of the absolute monarchy in France.

(*c*) In English History: The Constitutional issues involved in the English Revolution of 1688.

(*d*) In Political Economy: The financial and economical reforms of Alexander Hamilton.

(*e*) In International Law: The Alabama Question in its historical and its legal aspects.

French; German.—The candidate must have won mid-course honors, and have passed, with an honorable average, an amount of optional work of the junior and senior years equivalent to three hours a week through two years; he must also present a satisfactory thesis, and must pass, with distinguished excellence, an examination upon the following subjects:

(*a*) Translation at sight from French or German.

(*b*) Translation from English into French or German.

(*c*) The political and literary history of some specified period.

(*d*) Certain specified works of that period.

The subjects for 1885 are, in French: the political and literary history of France under the Second Empire, 1852-1870; and the following authors: Emile Augier (selections from drama); Victor Cherbuliez (selections from novels); Octave Feuillet; and Edmond About (selections). The subject of the thesis required is a study of the literature of the above period with special reference to the influence of the Romantic School.

In German the subjects for 1885 and 1886 are: the political and literary history of Germany from Lessing to the death of Schiller; and the following authors: Lessing (selections from the Hamburgische Dramaturgie), Goethe (Wahrheit und Dichtung, Books 6–20), the correspondence between Schiller and Goethe. The subject of the thesis required is the *Sturm und Drang* period.

Greek; Latin.—The candidate must have won mid-course honors, must have passed, with an honorable average, in three hours a week of optional work for each of the junior and senior years, if the subject be Greek, in four hours, if it be Latin; and must also pass, with distinguished excellence, a special examination upon the following subjects:

(*a*) Translation at sight from the more difficult Greek or Latin authors.

(*b*) Translation from English into Greek or Latin.

(*c*) Translation from specified Greek or Latin authors (with commentary upon the questions of history, archæology, grammar, and etymology involved).

For final honors, 1885, in Greek: Æschylus' Agamemnon; Demosthenes' De Corona. In Latin: Plautus' Trinummus; Terence's Andria; the first two Philippics of Cicero. For 1886, Plautus' Rudens, Terence's Andria the second, Cicero fourteenth Philippics.

Mathematics.—The candidate must have won mid-course honors, and must have passed, with an honorable average, in the junior work in the integral calculus, differential equations, and finite differences, and in the senior work in analytical mechanics; must pass, with distinguished excellence, an examination in special junior work in analytical geometry and calculus equivalent to two hours a term, and in special senior work, equivalent to four hours a term; and must also present a satisfactory thesis.

Chemistry; Physics.—The candidate must, by the beginning of his senior year, have completed, with an honorable average, the

required chemical and physical work of the first three years of the course in chemistry and physics, together with not less than half the whole number of hours of laboratory work in chemistry and physics laid down in the fourth year of the course; and in the senior year, besides the remaining hours of chemical and physical laboratory work, he must devote at least seven additional hours a week to advanced work in either the chemical or the physical laboratory, for the preparation of a thesis based upon original investigation; and must pass, with distinguished excellence, an examination upon the subject of his special work.

Entomology.—The candidate must have passed, with an honorable average, the regular examinations in the subjects of zoölogy (vertebrate and invertebrate), microscopic technology, botany (the elementary course, including field-work), and entomology (the general course, as laid down in the sophomore and junior years in the course in Agriculture); and must also pass, with distinguished excellence, a special examination upon the results of an investigation of one or more special subjects to which he has devoted an amount of work equivalent to two hours a term for two years.

The subject for 1885 is to be selected from the following list:

(*a*) The internal anatomy of the larva of the corydalus cornutus Linn.

(*b*) The insects injurious to woolen goods in the United States.

(*c*) The insects infesting apple trees at Ithaca.

(*d*) The insects injurious to wheat in the north-eastern part of the United States.

UNIVERSITY SCHOLARSHIPS AND FELLOWSHIPS.

The Trustees of Cornell University have set apart, from the money given in 1872 by the Hon. Ezra Cornell, John McGraw, Esq., the Hon. Henry W. Sage, the Hon. Hiram Sibley, and Andrew D. White, a sum amounting to one hundred and fifty-five thousand dollars for the establishment of Scholarships and Fellowships to aid meritorious students, both male and female, in the prosecution of their studies at this University. They have also set apart, from the fund contributed by the Hon. Henry W. Sage for the superior education of women, the sum of fifty thousand dollars for the establishment of similar scholarships and fellowships for lady students only.

Scholarships.

Pursuant to this action, there will be thrown open to competition for all students, annually, at the entrance examinations of the University, six scholarships, of the value of two hundred dollars each, and three of the same value for women only. The total number of scholarships on both these foundations will, therefore, be thirty-six.

Each of these scholarships will be continued for four years, provided the student maintains throughout his course the same high standing with which he enters; and the total amount received by each successful competitor will thus be eight hundred dollars. Students of high ability from the State of New York will have the additional advantage of being able to secure State scholarships, as there is nothing in the University statutes preventing a student from holding both a State and University scholarship.

The rules laid down by the Trustees and Faculty provide that the name of every successful competitor for these scholarships

shall be inserted in the annual Register of the University, together with the name of the school at which he or she was fitted for college, and the name of the Principal by whom he was prepared; and that these names shall remain in the Register as long as he or she retains the scholarship.

It has also been thought best to give the scholarships to the candidates passing the best examination, having regard only to ability. It is believed that in this way alone can the bestowal of the scholarhips be put on the proper footing—that is, as an award to merit, and not as a dole to poverty; but the experience of Trustees and Faculty leads them to believe that a system based on merit alone will inure mainly to the benefit of students of small means; since it is a well-known fact that in all the colleges of this country the great majority of the best scholars come, not from the wealthy class, but from those whose circumstances have forced them to feel the need of thrift and energy.

Of the University scholarships, not less than two, and not more than three, as the Faculty may determine, are awarded to students of either sex entering the freshman class, in any course, who, while maintaining a good standing in the other studies required for admission to the Arts course, pass the best examination in the Latin and Greek required for admission to that course, and the remainder—that is to say, not more than four and not less than three of the said University scholarships,—are awarded to those students entering any course in the University, who, while maintaining a good standing in the other studies required for admission to the course, and especially in English Grammar, pass the best examination in the various branches of mathematics required for entrance, namely, in Arithmetic, Algebra, and Geometry.

Students entering the courses in Literature, Philosophy, or History and Political Science, must pass their examination in the Latin required for admission to those courses. But neither the French nor the German required for admission to certain courses will be absolutely required of the candidate until the beginning of the University year 1886–87, though in any case where two candidates are of equal merit in other respects, the one passing the entrance examination in French or German will have the preference.

Of the Sage scholarships for women, one is awarded on the basis of an examination in Latin and Greek, as in the case of the

University scholarships, and the remaining two are awarded on the same basis as the other University scholarships, as above described.

The examinations will be held at or near the same time as the entrance examinations in September, the applicants for scholarships taking the examination papers that are specially prepared for that purpose, samples of which are given in the appropriate place below.

In case of the death of the student who has been appointed to any scholarship, or of his or her forfeiting it by bad conduct or insufficient progress in the studies of his course, the scholarships may be awarded for the remainder of the four years to another student who is in the same class.

FELLOWSHIPS.

The Fellowships are seven in number. They are known as the Cornell Fellowship, the McGraw Fellowship, the Sage Fellowship, the Schuyler Fellowship, the Sibley Fellowship, the Goldwin Smith Fellowship, and the President White Fellowship. They are awarded to graduates of this and other Universities who have shown marked ability in some department of study. Each of them secures to the successful competitor four hundred dollars a year for one or (in cases of exceptional merit) for two years. Any young man or woman of really high attainments and character, securing one of the scholarships, and doing thoroughly well in it, may look forward with strong hope to securing one of these fellowships, which will enable him to prosecute post-graduate studies.

The appointments to the Fellowships are made in part or wholly at the close of the academic year, and just before Commencement. In case of our own graduates, the appointments may be made by vote of the Faculty on the general record of the applicant and what they may know personally concerning him, or there may be a competitive examination held as a means of discriminating among several candidates. In the case of graduates of other colleges or universities, the Faculty may depend entirely upon testimonials laid before them, or they may appoint an examination as in the case of their own graduates.

All fellowships imply residence at the University, and the fellowship will be forfeited by either a failure to accomplish satisfactory results in scholarship, or by conduct unbecoming or improper for a member of the University.

STATE SCHOLARSHIPS.

1. By the Laws of the State of New York, Chapter 585, § 9, and Chapter 684, § 1, the School Commissioners and city Boards of Education of the State of New York are obliged to hold a competitive examination in each year, in each county or city in the State, for the purpose of selecting scholars for the Free Scholarships in Cornell University.

2. The law thus imposing a duty on the School Commissioners and city Boards of Education is understood to *confer a right* upon every student who is qualified to enter the examination and desires to obtain the scholarship, to have such an examination held, and it is believed that any such candidate for the scholarship can enforce his right, if need be, by an appeal to the proper State authorities.

3. Only one examination can be held during the year in any one county or city.

4. This examination *ought to be* held in the summer after the close of the public schools for the season, and before the beginuing of the Fall Term of the University.

5. Of the time and place at which the competitive examination is to be held, due public notice should be given at a reasonable time before the examination is to be held.

6. At the examination it is not *necessary* that more than one of the Commissioners or of the School Board should be present, though it is highly desirable that a majority of them, when there is more than one, should be present and take part in conducting the examination.

7. The laws of the State do not designate the studies in which the applicant shall be examined, nor have the Trustees of the University expressed any opinion on the subject; but it is manifestly unfair to impose an examination in any study required for admission to a course which only a part of the competitors expect to enter.

8. Persons to be admitted to the examination must have been educated in the academies and public schools of the State, and *in the county* in which they offer themselves for the competition.

9. It is not understood that the applicants must necessarily be residents of the county in which they seek the scholarship, but only that they should have attended an academy or public school long enough to be entitled to be regarded as having obtained their education, or at least a part of it, in the county. The length of time is not fixed by law.

10. Nor is it regarded as necessary that the applicants shall come from the different Assembly Districts in those counties in which there is more than one such District. And in deciding upon the merits of the competitors and awarding the certificates, no regard need be paid to the Assembly District in which the applicant may have his residence, or may have attended the academy or public school, although the certificate must name the District for which the appointment is made.

11. No student who has once been admitted to the University and received any instruction therein, may be admitted to examinations as a competitor.

12. But it is not understood by the Trustees that the fact that a student who is otherwise qualified to be a competitor and to receive the appointment, ought to be debarred from his right to enter the examination, in consequence of having finished his studies and been out of school for one or two years; especially if during this time he has been occupied in providing the means of defraying his expenses while attending upon the University. Nor do they think that the fact of his having been engaged out of the county during this time and for the purpose above mentioned ought to work to his disadvantage.

13. If, however, the student has been attending school, whether a public or a private school, out of the county, for the period which intervenes between his attendance upon the schools in the county and his application to be received as a competitor, this, it is thought, ought to exclude him from the examination.

14. The certificate of scholarship must in all cases be awarded on the basis of the competitive examination as above described, and not on any examination held otherwise or elsewhere, or on any testimonials obtained from any other source.

15. In all cases of contested or duplicate certificates, the Trustees have decided and instructed their Treasurer to accept

the first certificate that is in due form and granted by the proper authorities in the several counties in said State whereby free scholarships are granted to the said University. The University proposes to leave all questions as to the regularity of the proceedings and the rights of the respective parties that may be claimants for the certificate to be adjusted in the county from which the student comes and by the authorities that reside there.

16. In case any student to whom a certificate has been awarded has died, resigned his certificate, or been expelled from the University, a new certificate, which may state the facts in the case, may be given by the Commissioners or Board of Education of the county, to one of those who were present and competitors at the examination on which the certificate was originally awarded, always giving preference to competitors in the order of superiority of scholarship.

17. The certificates thus given are good for four years from the time when the examination was held. And in case of a new certificate, as above provided, the certificate will be accepted for only that portion of the four years which remains unexpired.

18. No allowance will be made in any case for absence or non-attendance upon the University by any student holding a certificate of State Scholarship. His certificate secures him free tuition for only that part of the four years during which he is in attendance upon his University duties.

19. It will be seen from the above statements that only one examination and only one appointment can be made for any one year for the same District. Hence, if no appointment is made for any one year at the appropriate time during the year, no appointment can be made for that year at any subsequent time.

20. No vacancy that can be filled ever arises from the neglect to appoint or the non-appointment of a scholar for any District. Vacancies that can be filled can arise only by the appointees having been removed from the University for some cause or other.

21. No appointment can be made from any one county in the State to fill a vacancy in any Assembly District of the State in another county.

EXAMINATION PAPERS.

ENTRANCE EXAMINATIONS.

I. ARITHMETIC.

1. Resolve into their prime factors the numbers 216, 360, 432, and 648; and thence find their greatest common divisor and their least common multiple.

2. Reduce to its simplest form the complex fraction:

$$\frac{\frac{5}{6} \text{ of } \frac{12}{7}}{6\frac{1}{5}-5\frac{4}{15}} \div \frac{\frac{2}{3} \times \frac{11}{12}}{\frac{1}{15} \times 5\frac{1}{2}}.$$

3. Show how to convert pure circulating decimals, and mixed circulating decimals, into common fractions; and explain the reason for your rule.

4. Find the cost of plastering the walls and ceiling of a room 7 metres long, 5 wide, and $3\frac{1}{2}$ high, at 20 cents per square metre; deducting for a base-board 25 centimetres wide, around the room, and 18 square metres more for doors and windows.

How high is the room, in feet and inches?

5. Find the difference between true and bank discount upon \$2500 payable in 3 months at 7 per cent., making no allowance for grace.

6. Having received a stock dividend of 8 per cent., I now own 297 shares. Find how many shares I had before the dividend was declared.

7. If two men, working 10 hours a day for $94\frac{1}{2}$ days, dig a trench $33\frac{3}{4}$ yards long, $2\frac{5}{8}$ wide, and $2\frac{2}{3}$ deep; find how many hours a day 35 men must work for 11 days, to dig a trench 90 yards long, $1\frac{5}{8}$ wide, and $2\frac{1}{3}$ deep.

8. Extract the square root, to six decimal places, of

$$.000986399649.$$

II. ENGLISH GRAMMAR.

1. Give illustrations of all the parts of speech.
2. Define *pronoun*, *preposition*, *adverb*, *clause*, *phrase*, and *adjunct*.
3. How are the possessive cases of nouns and pronouns formed?
4. Give illustrations of the two infinitives.
5. Define and illustrate verbs of the old or strong conjugation.
6. State the difference in use between *shall* and *will*.
7. Write a sentence illustrating the use of the subjunctive mode.
8. Define and illustrate derivation and composition.
9. Analyze the following sentence and parse in full all the words in it:

   All that I dread is leaving you behind.
10. Distinguish between *lie* and *lay*; *my* and *mine*.
11. Of what nature are the subordinate clauses in the following sentences:

    a. *The bird that I saw was dead.*
    b. *She went to where he stood.*
    c. *They stood silent as he advanced.*
12. Give a synopsis of the preterit of *teach*, including the emphatic form.
13. Name and illustrate the different classes of adverbs.
14. Justify or correct the following sentences:

    a. *I had rather stay.*
    b. *He spoke of Cæsar crossing the Rubicon.*
    c. *Dot your i s and cross your t s.*
    d. *He not only owns a house but also a farm.*
    e. *Neither you or I am going.*
    f. *Rounding the point the city came into sight.*
15. Write a composition on one of the following subjects:

    Bicycling, Different ways of Traveling, The Presidential Election.

III. GEOGRAPHY.

1. Draw an outline map of Asia, and show thereon (1) the principal rivers and mountain chains; (2) the political divisions and chief cities.
2. Name the gulfs, seas, and bays, that border the coast of Asia.
3. Give some account of the Empire of China and state (1) its area; (2) its population; (3) its form of government; (4) its religion; (5) the chief industries of the people.

4. Name the five principal countries of Europe in the order of (1) their size; (2) their population; (3) their wealth; (4) the intelligence of their people, and their advancement in civilization.

5. Name the capitals of these five countries; give their populations, and their latitudes.

6. Give a general description of Africa; state its size, location, and physical characteristics.

7. State what parts of Africa are civilized, what parts are half civilized, and what parts are barbarous.

8. Draw an outline map of South America, and show its chief rivers, mountains, political divisions, and cities.

9. State what parts of South America have abundant rains, and what parts are dry; and give the reasons therefor.

10. Name the three principal political divisions of North America, and give their locations with reference to each other.

11. What states of the United States (including territories) may be called cotton states? what, grain states? what, mining states?

12. What part of the world's population is Christian? what part is Mohammedan? what part is Buddhist?

IV. PHYSIOLOGY.

1. Draw diagrams of the permanent teeth on one side of the upper jaw, and give their names. State the differences in number and character between milk teeth and permanent teeth.

2. Draw an outline diagram of the alimentary canal, and name its parts.

3. Of what is the diaphragm composed? Draw diagrams showing its condition before and after inspiration.

4. What digestive actions are performed by the gastric juice? What ones can it not perform?

5. Draw a diagram of the right side of the heart showing the vessels and valves, and give their names.

V. PLANE GEOMETRY.

1. Define: an axiom, a point, an acute angle, a chord of a circle, a regular polygon, symmetry with respect to a centre.

2. If a series of parallels cut any two straight lines and intercept equal distances on one of these lines, they also intercept equal distances on the other line.

3. Upon a given straight line, to describe a segment that shall contain an angle equal to a given angle.

4. Two triangles are similar when they are mutually equiangular.

5. If homologous sides of two similar polygons be 7 feet and 9 feet respectively, find the ratio of the areas.

6. A circle may be circumscribed about any regular polygon; and a circle may be inscribed in the same polygon.

VI. ALGEBRA, THROUGH QUADRATICS.

I. Define: division, a trinomial, a simple equation, a complex fraction, a power and its exponent, an incommensurable, an imaginary.

2. Resolve into two factors $x^3 - a^3$; and $32x^5 + 243a^5$.

3. Find the sum as a single fraction in lowest terms of

$$\frac{4}{(a-b)\ (a-c)},\ -\frac{1}{(b-a)\ (b-c)},\ \frac{1}{(c-a)\ (c-b)}.$$

4. A and B can do a piece of work together in 12 days; A and C, in 15 days; B and C, in 20 days. Find in what time all three together can do it.

5. Determine the value of x from the three simultaneous equations $cy + bz = a$, $az + cx = b$, $bx + ay = c$.

6. Explain why every number has two square roots; and why $\sqrt{a^4}$ has more values than $(\sqrt{a})^4$.

7. Find the two values of x from the quadratic equation,

$$x^2 - (m+n)x = \tfrac{1}{4}\ (p+q+m+n)\ (p+q-m-n).$$

8. Find all the values of y from the equation $y^4 + 3y^2 = 4$.

9. Find fractions equivalent to the following, but with rational denominators:

$$\frac{7}{2\sqrt{5} - \sqrt{6}};\quad \frac{2\sqrt{x} - \sqrt{y}}{\sqrt{4x} + \sqrt{y}};\quad \frac{a + b\sqrt{-1}}{a - b\sqrt{-1}}.$$

VII. SOLID GEOMETRY AND CONIC SECTIONS.

1. Define: a plane, a parallelopiped, a diedral angle, two symmetrical triedral angles, a segment of a sphere, the axis of a parabola.

2. If a straight line be perpendicular to each of two straight lines at their point of intersection, it is perpendicular to the plane of those lines.

3. Two prisms are equal, if three faces including a triedral angle of one be respectively equal to three faces similarly placed and including a triedral angle of the other.

4. All points of a circle of the sphere are equally distant from either pole of the circle.

5. The volume of a spherical sector is equal to the area of the zone that forms its base multiplied by one-third of the radius of the sphere.

6. To find two straight lines in the ratio of the volumes of two given cubes.

7. In a parabola, the subnormal equals half the parameter.

8. The ordinate of any point of an ellipse is to the ordinate of the corresponding point of the circumscribed circle as the conjugate semi-axis is to the transverse semi-axis.

VIII. HIGHER ALGEBRA.

1. Prove that in a series of equal ratios, the sum of the antecedents is to the sums of the consequents as any one antecedent is to its consequent.

2. Insert three arithmetical, three geometrical, and three harmonical means between 5 and 13.

3. Expand $(2x-3y)^{-\frac{1}{4}}$ to four terms by the binomial theorem.

4. Resolve $\frac{157}{264}$ into a continued fraction, and find all the convergents.

5. Expand $\dfrac{2+3x}{1+x+x^2}$ and $\sqrt{a-x}$ to 3 terms by the method of undetermined coefficients.

6. Find the 50th term of tbe series 1, 3, 8, 20, 43 by the method of differences.

7. If the coefficient of the first term of an equation be unity, and those of the other terms be integers, the equation cannot have a fractional commensurable root.

8. Find to two decimal places one root of the equation

$$x^3-6x^2+3x+5=0.$$

IX. TRIGONOMETRY.

I. For any angle θ, show that:

$$\sin(\pi+\theta) = -\sin\theta, \quad \csc(\pi+\theta) = -\csc\theta.$$
$$\cos(\pi+\theta) = -\cos\theta, \quad \sec(\pi+\theta) = -\sec\theta.$$
$$\tan(\pi+\theta) = +\tan\theta, \quad \cot(\pi+\theta) = +\cot\theta.$$

2. Find all the angles:

whose sines are $\pm\sqrt{\frac{1}{2}}$,

whose cosines are $\pm\frac{1}{2}\sqrt{3}$,

whose tangents are $\tan \frac{1}{8}\pi$,
whose cotangents are $\tan 20°$,
whose secants are ∞,
whose cosecants are $\pm \sqrt{2}$.

3. Name the four cases for the solution of right plane triangles, and show in detail how to solve each one of them.

4. In any plane triangle ABC, show that

$$\sin \tfrac{1}{2} A = \sqrt{\frac{(s-b)(s-c)}{bc}},$$

wherein a, b, c are the lengths of the sides that lie opposite the angles A, B, C, respectively, and $s = \frac{1}{2}(a+b+c)$.

Thence show how to solve a plane triangle when the three sides are given.

5. Find the area of the plane triangle, having given

$$\angle A = 37° \ 18', \ \angle B = 92° \ 18', \text{ and side } c = 39.5 \text{ yards};$$

and find the lengths of the perpendiculars from the three vertices to the opposite sides.

6. In any spherical triangle, ABC, show that

$$\cos \tfrac{1}{2} a = \sqrt{\frac{\cos (S - B) \cos (S - C)}{\sin B \sin C}},$$

wherein S is the half-sum of the three angles, and a is the side opposite $\angle A$.

7. Using the formula in question 6, solve the oblique spherical triangle, having given $\angle A = 120°$, $\angle B = 130°$, $\angle C = 80°$.

X. FRENCH.

I.

1. I should like to tell your father that I fear his sick daughter will die before he comes, if he does not hurry.

2. Which knife do you prefer, the small one or your brother's? I do not like either. Mine is better than your brother's and larger than the small one.

3. Lend me your pen, if you please. I cannot lend it to you; I lent it to William.

4. I shall expect you and your wife at my house to-morrow. We will dine at half-past two.

5. Have you seen the lady whose daughter was here yesterday? No, but I met her the other day at my cousin's, she is a very pleasant and ladylike person.

6. Honesty will always have its reward, whatever you may think of it. It is better to be honest than to be rich.

7. How long has your father been dead? He died in the month of February, 1864, at his home in New York.

8. Do you believe that plants grow in the night? Some persons do not believe that they grow as rapidly in the night as in the day.

9. In vain do you ask me to do this for you, my duty forbids me to listen to you.

10. In case you do not receive your book by the post, I will lend you mine in order that you may study your lesson, provided you will return it promptly.

11. I do not doubt it will be raining to-morrow, but I am very warm now.

12. Your nephew is the shortest man I ever saw. How old is he? He will be twenty-five years old next May.

II.

Translate:

La fonte des neiges avait commencé le 18 ou le 19 mars. Je me rappelle que pendant la grande revue d'Alsace, sur un large plateau d'où l'on découvre le Mein à perte de vue, la pluie ne cessa point de tomber depuis dix heures du matin jusqu'à trois heures de l'après-midi. Nous avions à notre gauche un château, dont les gens regardaient par de hautes fenêtres, bien à leur aise, pendant que l'eau nous coulait dans les souliers. A droite bouillonnait la rivière, que l'on voyait comme à travers un brouillard.

Pour nous rafraîchir les idées, a chaque instant on nous criait: 'Portez arme! Arme bras!'

Le maréchal s'avançait lentement, au milieu de son état major. Ce qui consolait Zébédé, c'était que nous allions voir le brave des braves. Moi, je pensais: 'Si je pourais le voir au coin du feu, ça me ferait plus de plaisir.'

Enfin il arriva devant nous, et je le *vois* encore avec son grand chapeau trempé de pluie, son habit bleu couvert de broderies et de décorations et ses grandes bottes. C'était un bel homme, d'un blond roux, le nez relevé, les yeux vifs, et qui paraissait terriblement solide. Il n'était pas fier, car, comme il passait devant la compagnie, et que le capitaine lui présentait les armes, tout à coup il se retourna sur son grand cheval et dit tout haut:

'Tiens, c'est Florentin!'

Alors le capitaine se redressa sans *savoir* que répondre. Il parait que le maréchal et lui avaient été simples soldats ensemble, du temps de la République. Le capitaine à la fin *répondit*.

'Oui, maréchal, c'est Sebastien Florentin—Ma foi, Florentin, dit le maréchal en étendant le bras du côté de la Russie, je suis content de te ravoir ; je te *croyais* couché là-bas.'

Toute notre compagnie était contente, et Zébédé me *dit :*

'Voilà ce qui s'appelle un homme ; je me *ferais* casser la tête pour lui ! '

Je ne voyais pas pourquoi Zébédé voulait se *faire* casser la tête, parce que maréchal avait dit bonjour à son vieux camarade.

—*Le Conscrit de* 1813.

Give the 1st person sing. and 1st pers. plural of the preterit, future present subj. of the italicised verbs.

III.

Translate at sight :

C'est La Fontaine qui est notre Homère. Car d'abord il est universel comme Homère : hommes, dieux, animaux, paysages, la nature éternelle et la société du temps, tout est dans son petit livre. Les paysans s'y trouvent, et à côté d'eux les rois, les villageoises auprès des grandes dames, chacun dans sa condition avec ses sentiments et son langage, sans qu'aucun des détails de la vie humaine, trivial ou sublime, en soit écarté pour réduire le récit à quelque ton uniforme ou soutenu. Et néanmoins ce récit est idéal comme celui d'Homère.

—*La Fontaine*, H. A. TAINE.

XI. GERMAN.

I.

Translate :

Der Ritter fuhr in seiner Erzählung fort : "Ich wäre mit meinem scheuen Pferde fast gegen Baumstämme und Aeste angerannt ; es triefte vor Angst und Erhitzung, und wollte sich doch noch immer nicht halten lassen. Zuletzt ging es gerade auf einen steinigen Abgrund los ; da kam mir's plötzlich vor, als werfe sich ein langer, weisser Mann dem tollen Hengste quer vor in seinen Weg ; der entsetzte sich davor, und stand ; ich kriegte ihn wieder in meine Gewalt, und sah nun erst, dass mein Retter kein weisser Mann war, sondern ein silberheller Bach, der sich neben mir von einem Hügel herunterstürzte, meines Rosses Lauf ungestüm kreuzend und hemmend."

"Danke, lieber Bach ! " rief Undine, in die Händchen klopfend. Der alte Mann aber sah kopfschüttelnd in tiefem Sinnen vor sich nieder.

"Ich hatte mich noch kaum im Sattel wieder zurecht gesetzt, und die Zügel wieder ordentlich recht gefasst," fuhr Huldbrand fort, "so stand auch schon ein wunderliches Männlein zu meiner Seite, winzig und hässlich über alle Massen, ganz braungelb, und mit einer Nase, die nicht viel kleiner war, als der ganze übrige Bursche selbst. Dabei grinste er mit einer recht dummen Höflichkeit aus dem breit geschlitzten Maule hervor, und machte viele tausend Scharrfüsse und Bücklinge gegen mich. Weil mir nun das Possenspiel sehr missbehagte, dankte ich ihm ganz kurz, warf meinen noch immer zitternden Gaul herum, und gedachte, mir ein anderes Abenteuer, oder, dafern ich keines fände, den Heimweg zu suchen, denn die Sonne war während meiner tollen Jagd schon über die Mittagshöhe gen Westen gegangen. Da sprang aber der kleine Kerl mit einer blitzschnellen Wendung herum, und stand abermals vor meinem Hengste.—"Platz da!" sagt' ich verdriesslich; "das Thier ist wild und rennet dich leichtlich um."—"Ei," schnarrte das Kerlchen, und lachte noch ensetzlich viel dummer; "schenket mir doch erst ein Trinkgeld, denn ich hab' ja euer Rösselein aufgefangen; lägt ihr doch ohne mich sammt eurem Rösselein in der Steinkluft da unten; hu!"—"Schneide nur keine Gesichter weiter," sagte ich, "und nimm dein Geld hin, wenn du auch lügst, kenn siehe, der gute Bach dorten hat mich gerettet, nicht aber du, höchst ärmlicher Wicht." Und zugleich liess ich ein Goldstück in seine wunderliche Mütze fallen, die er bettelnd vor mir abgezogen hatte. Dann trabte ich weiter."

1. Give the principal parts of *fuhr—fort* (1), *angerannt* (2), *werfe* (6), *sah* (8), *missbehagte* (24), *gedachte* (25), *fände* (26), *aufgefangen* (34), *lägt* (35), *Schneide* (36), *gerettet* (39).

2. Give the nominative and genitive singular and the nominative plural, with the appropriate article, of *Erzählung* (1), *Aeste* (2), *Abgrund* (5), *Gewalt* (8), *Bach* (10), *Seite* (18), *Massen* (19), *Abenteuer* (26), *Jagd* (28), *Rösselein* (34), *Trinkgeld* (34).

3. (*a*) Explain the use of the mood in *wäre* (1), *werfe* (6), *fände* (26), *lägt* (35). (*b*) Decline throughout *meinem scheuen Pferde* (2). (*c*) Give the prepositions governing the genitive, dative, and accusative cases. (*d*) What is the position of the verb in principal and subordinate sentences? (*e*) What office in the sentence do the following subordinate clauses perform, viz: those

introduced by *als* (5), *der* (7), *dass* (8), *weil* (23). (*f*) Give cognate words in English or in other languages of the German words in the first three lines of the text. (*g*) Parse *fast* (2), *sich* (3), *halten* (4), *Hengste* (6), *der* (7), *sondern* (9), *rief*, (12).

II.

Translate at sight:

Ein Franzose ritt eines Tages auf eine Brücke zu, die so schmal war, dass zwei Reiter einander kaum darauf ausweichen konnten. Ein Engländer betrat zugleich das entgegengesetzte Ende derselben, und als beide auf der Mitte waren, wollte keiner dem andern Platz machen. "Ein Engländer geht keinem Franzosen aus dem Wege," sagte der Britte. Der Franzmann erwiederte, "Mein Pferd ist auch ein Engländer." Aber der Engländer machte sich wenig aus diesem Einfalle sondern sagte, "Ich kann warten; ich habe hier die schönste Gelegenheit die heutige Zeitung zu lesen, bis es euch gefällt, Platz zu machen."

Also zog er kaltblütig eine Zeitung aus der Tasche, wickelte sie auseinander, und las darin eine Stunde lang, während dass der Franzose eine Pfeife Tabak hervornahm und zu rauchen anfing. Die Sonne neigte sich allmählig gegen die Berge hinab, und sah nicht aus, als ob sie die Thoren noch lange anschauen wollte. Nach einer Stunde aber, als der Engländer fertig war und die Zeitung wieder zusammenlegen wollte, sah er den Franzosen an und sagte, "Nun denn?" Dieser aber, der nicht auf den Kopf gefallen war, erwiederte, "Seid so gut und gebt mir jetzt das Blatt, welches ihr studirt habt, auch ein wenig, auf dass ich ebenfalls darin lesen kann, bis es euch gefällt auszuweichen." Als der Engländer die Geduld seines Gegners sah, sagte er, "Wisst ihr was, ich will euch ausweichen," und er machte ihm alsobald Platz.

III.

Translate into German:

THE BROKEN HORSESHOE.[1]

A peasant went with his son, little Thomas, to the city. "Look," said he on the way [2] to him, "there lies a piece of a horseshoe on the earth; pick it up [3] and put [4] it in thy pocket." "O," answered Thomas, "it is not worth the trouble,[5] that one should stop [6] for it." The father answered nothing, took the iron and

put it in his pocket. In the next village he sold it to the smith for three cents and bought cherries[7] in return.[8] Thereupon[9] he continued[10] his way. The heat was very great. One saw far and wide neither house nor forest nor spring. Thomas almost perished[11] with thirst,[12] and could only follow his father with difficulty.[5]

Then he let as if by chance[13] a cherry fall. Thomas picked it up eagerly[14] as if it were gold and put it quickly in his mouth. Some steps farther the father dropped a second cherry, which Thomas seized[15] with the same greediness.[16] This lasted[17] until he had picked them all up. When he had eaten the last, the father turned[18] to him and said, "Behold, if thou hadst been willing to stop a single time to pick up the horseshoe, thou wouldst not have needed[19] to stop a hundred times for the cherries."

1	Hufeisen.	7	Kirsche.	14	gierig.
2	unterwegs.	8	dafür.	15	ergreifen.
3	aufheben.	9	Hierauf.	16	Gierigkeit.
4	stecken.	10	fortsetzen.	17	fortdauern.
5	Mühe.	11	vergehen.	18	sich wenden.
6	sich bücken.	12	Durst.	19	nötig haben.
		13	durch Zufall.		

XII. LATIN.

[For the Courses in Arts, Literature, Philosophy, and History and Political Science.]

Translation at Sight and Grammar.

A. Hirtius, Gallic War, II.

Translate:

Caesar, cum animadverteret hostem complures dies castris palude et loci natura munitis se tenere neque oppugnari castra eorum sine dimicatione perniciosa nec locum munitionibus claudi nisi a maiore exercitu posse, litteras ad Trebonium mittit, ut quam celerrime posset legionem XIII, quae cum T. Sextio legato in Biturigibus hiemabat, arcesseret atque ita cum tribus legionibus magnis itineribus ad se veniret; ipse equites in vicem Remorum ac Lingonum reliquarumque civitatum, quorum magnum numerum evocaverat, praesidio pabulationibus mittit, qui subitas hostium incursiones sustinerent.

Decline *se*, *tribus legionibus*, and *magnis itineribus* (in both numbers).

Compare *celerrime*, *maiore*.

Give the principal parts (in both voices) of *animadverteret*, *tenere*, *claudi*, *sustinerent*. Inflect *mittit* in the present subjunctive passive, and *veniret* in the pluperfect subjunctive active. Give the first person singular active of the future indicative and the present subjunctive of *munitis*, *claudi*, *posse*, *hiemabat*, *sustinerent*.

Give the reason for the mood and for the tense of *posse*, *hiemabat*, *sustinerent*.

Give the reason for the case of *dies*, *eorum*, *itineribus*, *quorum*, *praesidio*.

Explain the composition of *civitatum*, *praesidio*, *incursiones*, giving prefix (if any), root, and suffix or suffixes employed to form the stem from the root, with the meaning of each of these parts.

VIRGIL.

Translate:

Adgredere O magnos—aderit iam tempus—honores,
cara deum suboles, magnum Iovis incrementum!
Aspice convexo nutantem pondere mundum,
terrasque tractusque maris caelumque profundum!
Aspice, venturo laetentur ut omnia saeclo!
O mihi tam longae maneat pars ultima vitae,
spiritus et quantum sat erit tua dicere facta!

—*Ecl.* IV, 48–54.

What is the subject of the eclogue?

Account for the mood and tense of *laetentur*.

Translate:

Quam simul ac tali persensit peste teneri
cara Iovis coniunx, nec famam obstare furori,
talibus adgreditur Venerem Saturnia dictis:
'Egregiam vero laudem et spolia ampla refertis
tuque puerque tuus, magnum et memorabile nomen,
una dolo divom si femina victa duorum est!
Nec me adeo fallit veritam te moenia nostra
suspectas habuisse domos Karthaginis altae.
Sed quis erit modus, aut quo nunc certamine tanto?
Quin potius pacem aeternam pactosque hymenaeos
exercemus? —*Aen.* IV, 90–100.

Write out the first two verses, dividing into feet and marking the cæsuras, and give the rules for the length of all penultimate and final syllables.

CICERO.

[Take 1, if you have read the oration, otherwise 2.]

1. Translate:

Nam, quas res nos in consulatu nostro vobiscum simul pro salute huius urbis atque imperii et pro vita civium proque universa republica gessimus, attigit hic versibus atque incohavit; quibus auditis, quod mihi magna res et iucunda visa est, hunc ad perficiendum adiuvi. Nullam enim virtus aliam mercedem laborum periculorumque desiderat praeter hanc laudis et gloriae; qua quidem detracta, iudices, quid est, quod in hoc tam exiguo vitae curriculo et tam brevi tantis nos in laboribus exerceamus?

–*Arch.* XI, 28.

Explain more fully what Cicero says of his connection with Archias. What is the purpose of the oration?

2. Translate:

Quem quidem ego cum ex urbe pellebam, hoc providebam animo, Quirites, remoto Catilina non mihi esse P. Lentuli somnum, nec L. Cassii adipes, nec C. Cethegi furiosam temeritatem pertimescendam. Ille erat unus timendus ex his omnibus, sed tam diu, dum moenibus urbis continebatur. Omnia norat, omnium aditus tenebat; appellare, tentare, sollicitare poterat, audebat; erat ei consilium ad facinus aptum; consilio autem neque lingua neque manus deerat; iam ad certas res conficiendas certos homines delectos ac descriptos habebat; neque vero, cum aliquid mandaverat, confectum putabat. Nihil erat, quod non ipse obiret occurreret, vigilaret laboraret; frigus sitim famem ferre poterat.

--*Cat.* III, 7.

Account for the case of *mihi*, *ei*. What other construction could replace *ex his omnibus?* Account for the mood of *laboraret*.

COMPOSITION.

Translate into Latin:

Cicero hoped that Catiline would go out from the city of his own accord, and in this way show that he was an enemy to the state. He therefore, after intercepting certain letters, accused Catiline in the presence of the senate of having plotted[1] against the lives of the citizens. Catiline left the senate-house, not because he was ashamed of his purposes, but because those who were present, as if with one voice, called him "traitor" and "parricide."

[1] insdiari.

XIII. GREEK.

I.

Attic Prose.

Ἐντεῦθεν ὑπολαβὼν Ἀγασίας Στυμφάλιος εἶπεν. Ἀλλὰ τούτῳ γε οὔτε τῆς Βοιωτίας προσήκει οὐδὲν οὔτε τῆς Ἑλλάδος παντάπασιν· ἐπεὶ ἐγὼ αὐτὸν εἶδον ὥσπερ Λυδὸν ἀμφότερα τὰ ὦτα τετρυπημένον. Καὶ εἶχεν οὕτως. Τοῦτον μὲν οὖν ἀπήλασαν· οἱ δ' ἄλλοι παρὰ τὰς τάξεις ἰόντες ὅπου μὲν στρατηγὸς σῶος εἴη τὸν στρατηγὸν παρεκάλουν· ὁπόθεν δὲ οἴχοιτο τὸν ὑποστρατηγόν· ὅπου δ' αὖ λοχαγὸς σῶος εἴη τὸν λοχαγόν. Ἐπεὶ δὲ πάντες συνῆλθον, εἰς τὸ πρόσθεν τῶν ὅπλων ἐκαθέζοντο· καὶ ἐγένοντο οἱ συνελθόντες στρατηγοὶ καὶ λοχαγοὶ ἀμφὶ τοὺς ἑκατόν. Ὅτε δὲ ταῦτα ἦν, σχεδὸν μέσαι ἦσαν νύκτες. Ἐνταῦθα Ἱερώνυμος Ἠλεῖος πρεσβύτατος ὢν τῶν Προξένου λοχαγῶν ἤρχετο λέγειν ὧδε· Ἡμῖν, ὦ ἄνδρες στρατηγοὶ καὶ λοχαγοί, ὁρῶσι τὰ παρόντα ἔδοξε καὶ αὐτοῖς συνελθεῖν καὶ ὑμᾶς παρακαλέσαι, ὅπος βουλευσαίμεθα εἴ τι δυναίμεθα ἀγαθόν. Λέξον δ', ἔφη, καὶ σύ, ὦ Ξενοφῶν, ἅπερ καὶ πρὸς ἡμᾶς. —Xenophon, *Anabasis*, III, 1, 31.

Define *enclitic* and *proclitic*, giving examples from the above passage. Give the nom. and gen. sing. of ὦτα and τάξεις, with the rule for the accentuation of those forms. Decline ἐγώ through all numbers. Compare μέσαι.

Give the principal parts of εἶδον, ἀπήλασαν, συνῆλθον, ἔδοξε, δυναίμεθα. How is the present of ἐγένοντο formed from the verb stem? Give the general rule for the accentuation of verbs, and point out some exceptions to it that occur in the above passage.

Give the reason for the opt. in οἴχοιτο, βουλευσαίμεθα, δυναίμεθα. Recount briefly the events immediately preceding those described in this passage of the Anabasis.

Translate (at sight):

Ἀγησίλαος τοίνυν ἔτι μὲν νέος ὢν ἔτυχε τῆς βασιλείας· ἄρτι δὲ ὄντος αὐτοῦ ἐν τῇ ἀρχῇ, ἐξηγγέλθη βασιλεὺς ὁ Περσῶν ἀθροίζων καὶ ναυτικὸν καὶ πεζὸν

πολὺ στράτευμα ὡς ἐπὶ τοὺς Ἕλληνας· βουλευομένων δὲ περὶ τούτων Λακεδαιμονίων καὶ τῶν συμμάχων, Ἀγησίλαος ὑπέστη, ἐὰν δῶσιν αὐτῷ τριάκοντα μὲν Σπαρτιατῶν, δισχιλίους δὲ νεοδαμώδεις (freedmen), *εἰς ἑξακισχιλίους δὲ τὸ σύνταγμα τῶν συμμάχων, διαβήσεσθαι εἰς τὴν Ἀσίαν καὶ πειράσεσθαι εἰρήνην ποιῆσαι, ἢ ἂν πολεμεῖν βούληται ὁ βάρβαρος, ἀσχολίαν* (too much to do) *αὐτῷ παρέξειν στρατεύειν ἐπὶ τοὺς Ἕλληνας.*

—XENOPHON, *Agesilaus*, I, 6.

II.

COMPOSITION.

If King Agesilaus had not crossed over into Asia at that time, the Persians would have made an expedition against the Greeks with a great force of ships and men.

III.

HOMER.

Translate:

ἄλλος δ' ἄλλῳ ἔρεζε θεῶν αἰειγενετάων,
εὐχόμενος θάνατόν τε φυγεῖν καὶ μῶλον Ἄρηος.
αὐτὰρ ὁ βοῦν ἱέρευσεν ἄναξ ἀνδρῶν Ἀγαμέμνων
πίονα, πενταέτηρον, ὑπερμενέϊ Κρονίωνι·
κίκλησκεν δὲ γέροντας ἀριστῆας Παναχαιῶν,
Νέστορα μὲν πρώτιστα καὶ Ἰδομενῆα ἄνακτα,
αὐτὰρ ἔπειτ' Αἴαντε δύω καὶ Τυδέος υἱόν,
ἕκτον δ' αὖτ' Ὀδυσῆα, Διὶ μῆτιν ἀτάλαντον.
αὐτόματος δέ οἱ ἦλθε βοὴν ἀγαθὸς Μενέλαος·
ᾔδεε γὰρ κατὰ θυμὸν ἀδελφεὸν ὡς ἐπονεῖτο.
βοῦν δὲ περιστήσαντο, καὶ οὐλοχύτας ἀνέλοντο·
τοῖσιν δ' εὐχόμενος μετέφη κρείων Ἀγαμέμνων.
Ζεῦ κύδιστε, μέγιστε, κελαινεφές, αἰθέρι ναίων,
μὴ πρὶν ἐπ' ἠέλιον δῦναι, καὶ ἐπὶ κνέφας ἐλθεῖν,
πρίν με κατὰ πρηνὲς βαλέειν Πριάμοιο μέλαθρον
αἰθαλόεν, πρῆσαι δὲ πυρὸς δηΐοιο θύρετρα,
Ἑκτόρεον δὲ χιτῶνα περὶ στήθεσσι δαΐξαι
χαλκῷ ῥωγαλέον· πολέες δ' ἀμφ' αὐτὸν ἑταῖροι
πρηνέες ἐν κονίῃσιν ὀδὰξ λαζοίατο γαῖαν.

—*Iliad*, Book II.

Where formed (tense, mood, voice), and from what verbs, are *ἤδεε, περιστήσαντο, ἀνέλοντο, λαζοίατο*? Give the Attic form of the above.—Explain the use of the inf. in l. 413, and the opt. in l. 418.—Scan ll. 400, 404, 410, and explain the quantity of the final syllable of *ἄλλῳ* (in l. 400), *γέροντας, οὐλοχύτας*.

SCHOLARSHIP EXAMINATIONS.

I. ARITHMETIC.

1. Find the greatest common divisor, and the least common multiple, of $\frac{7}{8}$, $1\frac{10}{11}$, $3.\dot{6}\dot{0}$

2. Define *proportion*; and give the rules, with the reasons for them, whereby problems in simple and compound proportion are solved.

3. How is the *metre* defined, and how is it related to the decimetre, the litre, and the kilogramme?

How many grammes of a liquid $1\frac{1}{4}$ times as heavy as water would fill a cube whose edge is 20 centimetres? How many litres? How many million of such cubes would reach around the world?

4. At $37.50 per acre, find the cost of a rectangular field 55.33^{ch} long and $148^{rd}\ 3^{yd}\ 1^{ft}\ 6^{in}$ wide.

5. Find how much gold 15, 17, and 22 carats fine must be mixed with 5 ounces 18 carats fine, so as to make 12 ounces 20 carats fine.

6. Of a debt, one-third is to be paid in 2 months, one-fourth in 6 months, one-sixth in 10 months, and the balance in one year. Find at what time, in equity, the whole should be paid if all the payments were converted into one.

7. A speculator had 5000 barrels of flour that cost him $8 a barrel; he sold 30 p.c. of the lot at an advance of 10 p.c. on the cost, and 50 p.c. of the remainder at a further advance of $2\frac{1}{2}$ p.c. on the cost; and he closed out the lot at $8.50 a barrel. Find how much he made, and what percentage of the cost.

8. Define *interest*, and state the difference between simple and compound interest.

Define *discount*, and state the difference between true and bank discount.

9. Find what principal will amount to $1000 in $3^{y}\ 6^{m}$ at $3\frac{1}{2}$ p.c., compound interest.

10. Upon a note for $1000, dated January 1, 1878, due in one year, and bearing interest at the rate of 6 p. c. from the date of maturity, the following payments were made:

August 16, 1879,........................	$300
February 12, 1880,....................	200
October 3, 1881,.......................	50
January 27, 1882,......................	19
May 31, 1883,...........................	22

What was due January 1, 1884, by the United States rule for the computation of partial payments?

11. Define *cube root*, and give the rules, with the reasons for them, for finding the cube roots both of whole numbers and of fractions.

12. Find the fifth root of 14348907.

II. GEOMETRY.

1. The sum of the squares of the four sides of a quadrilateral is equal to the sum of the squares of the two diagonals and four times the square of the line that joins the middle points of the diagonals.

2. If a plane figure be symmetric about two axes at right angles to each other, it is also symmetric about the point of intersection of these axes, as a centre.

3. Two rectangles having the same altitude are to each other as their bases.

Prove the proposition both when the bases are commensurable and when they are incommensurable.

4. Draw a pentagon, and construct a triangle equal to it in area.

Construct carefully and explain fully.

5. Draw a circle, and inscribe in it a regular decagon, a regular hexagon, and a regular pentadecagon.

Construct carefully and explain fully.

6. A circle being given, two similar polygons may always be found, the one circumscribed about it and the other inscribed in it, whose areas shall differ by less than that of any assigned surface.

7. Of all triangles having the same altitude and the same vertical angle, the isosceles triangle has the least area.

8. If a quadrilateral be inscribed in a circle, the product of its diagonals is equal to the sum of the products of its two pairs of opposite sides.

9. The area of a trapezoid is double the area of a triangle whose base is one of the non-parallel sides of the trapezoid, and whose vertex is the middle point of the opposite side.

10. If AB be a fixed diameter of a circle, and if at C, a moving point on the circumference, a tangent be drawn, and if a perpendicular from B upon this tangent meet the chord AC produced, in D; find the locus of D.

11. If from either vertex of a parallelogram straight lines be drawn to the middle points of the two non-adjacent sides, these lines trisect a diagonal of the parallelogram.

12. Draw two similar polygons, and construct a third polygon that shall be similar to these two and equivalent to their sum.

Construct carefully and explain fully.

III. ALGEBRA.

1. Explain the nature of negative quantities, and the reason for the rule of signs in subtraction, and in multiplication.

2. Find the highest common divisor of

$$10a^2bx^3+5a^2bx^2+5a^2b,$$
$$15ab^2x^3+5ab^2x^2+5ab^2x+15ab^2, \qquad \text{and}$$
$$x^3+(a+b+1)x^2+(ab+a+b)x+ab.$$

Write the lowest common multiple of these three polynomials as a product of its prime factors; not actually performing the multiplication.

3. Demonstrate the rules by which problem 2 is solved.

4. Explain the fallacy in the following argument:—

"If $x=1$, then $x^2-1=x^3-1$;
$\therefore$, dividing by $x-1$, $x+1=x^2+x+1$,
$\therefore$ $2=3$."

5. Solve the simultaneous equations

$$2xy+3xz+4yz = 11,$$
$$3xy+4xz+2yz = -6,$$
$$4xy+2xz+3yz = 4.$$

6. If the circumference of a bicycle-wheel were 1 foot less, it would make 15 more revolutions in running a certain distance; but if the circumference were 1 foot more, it would make 13 less revolutions in that distance. Find the actual circumference, and the distance run.

7. Solve the quadratic equation

$$ax^2+bx+c = 0.$$

Show what the two values of x become when $c = 0$; also, when $a = 0$; also, when a is very small.

8. Show whether the following argument be sound:

$$\text{“}(\sqrt{-3})^2 = \sqrt{(-3 \times -3)} = \sqrt{9} = 3.\text{”}$$

9. Reduce to its simplest form the expression

$$(2x)^{\frac{2}{3}} y^{-\frac{1}{3}} \div \sqrt[3]{(6x^{-1} \cdot \sqrt{y})}.$$

10. Extract the cube root of the polynomial

$$x^6 + 6x^4 + 9x^2 - 4 - 9x^{-2} + 6x^{-4} - x^{-6}.$$

11. Solve $x^4 - 4x^3 - 4x^2 + 16x - 8 = 0$ as a quadratic equation, giving all the roots in their simplest form.

12. Find two numbers whose sum is 2, and the sum of whose 5th powers is 242. Give all the solutions.

IV. LATIN.

[For the Classical Scholarships, and the Scholarships in Latin and Mathematics.]

Translation at Sight and Grammar.

Translate:

Neque ullum fere totius hiemis tempus sine sollicitudine Caesaris intercessit, quin aliquem de consiliis ac motu Gallorum nuntium acciperet. In his ab Lucio Roscio, quem legioni decimae tertiae praefecerat, certior est factus, magnas Gallorum copias earum civitatum, quae Armoricae appellantur, oppugnandi sui causa convenisse, neque longius milia passuum octo ab hibernis suis afuisse, sed nuntio allato de victoria Caesaris discessisse, adeo ut fugae similis discessus videretur.

At Caesar principibus cuiusque civitatis ad se evocatis, alias territando, cum se scire, quae fierent, denuntiaret, alias cohortando, magnam partem Galliae in officio tenuit. Tamen Senones, quae est civitas in primis firma et magnae inter Gallos auctoritatis, Cavarinum, quem Caesar apud eos regem constituerat, cuius frater Moritasgus adventu in Galliam Caesaris cuiusque maiores regnum obtinuerant, interficere publico consilio conati, cum ille praesensisset ac profugisset, usque ad fines insecuti, regno domoque expulerunt; et missis ad Caesarem satisfaciendi causa legatis, cum is omnem ad se senatum venire iussisset, dicto audientes non fuerunt.

—CAESAR, B. G., v. 53–4.

Give the reason for the case of *quem* (after *Roscio*), *legioni*, *milia*, *territando*, *auctoritatis*, *regem*, and for the mood of *convenisse*, stating for each the Roman usage which it exemplifies.

What did Caesar mean by the imperfect tense in *denuntiaret*, the present in *est*, the pluperfect in *obtinuerant?*

Decline the phrases *hibernis suis*, *milia passuum octo*, and *fugae similis discessus.*

Compare *similis* and its corresponding adverb, *longius*, *firma.*

Give the principal parts, active and passive (where both exist), of *afuisse*, *fierent*, *iussisset*, *audientes.* Write the first and third persons singular active and passive (where both exist) of each of these verbs in the imperfect, future and future perfect indicative, the present subjunctive, the present participle and the future infinitive.

Analyze *legioni*, *victoria*, *regnum*, giving the meaning of each component part in each word.

By what case is the subject of an active verb expressed? by what the object? By what case is the subject of an active verbal noun expressed? by what the object? Give an example of each.

What is the essential difference in meaning between the indicative and the subjunctive moods?

Translate:

Summam video esse in te, Ser. Sulpici, dignitatem generis, integritatis, industriae ceterorumque ornamentorum omnium, quibus fretum ad consulatus petitionem adgredi par est. Paria cognosco esse ista in L. Murena atque ita paria, ut neque ipse dignitate a te vinci potuerit neque te dignitate superarit. Contempsisti L. Murenae genus, extulisti tuum. Quo loco si tibi hoc sumis, nisi qui patricius sit, neminem bono esse genere natum, facis ut rursus plebes in Aventinum sevocanda esse videatur.

—Cicero, *Mur.*, 7.

Explain the allusion in the last clause.

Virgil.

Translate:

D. Vis ergo inter nos quid possit uterque vicissim
experiamur? Ego hanc vitulam—ne forte recuses,
bis venit ad mulctram, binos alit ubere fetus—
depono: tu dic, mecum quo pignore certes.
M. De grege non ausim quicquam deponere tecum.
Est mihi namque domi pater, est iniusta noverca;
bisque die numerant ambo pecus, alter et haedos.

Verum, id quod multo tute ipse fatebere maius,
insanire libet quoniam tibi, pocula ponam
fagina, caelatum divini opus Alcimedontis;
lenta quibus torno facili superaddita vitis
diffusos hedera vestit pallente corymbos.

—*Ecl.* III, 28–39.

Where did bucolic poetry originate?

Translate:

Puppique deus consedit in alta,
Phorbanti similis, funditque has ore loquelas:
'Iaside Palinure, ferunt ipsa aequora classem;
aequatae spirant aurae; datur hora quieti.
Pone caput, fessosque oculos furare labori:
ipse ego paulisper pro te tua munera inibo.'
Cui vix attollens Palinurus lumina fatur:
'Mene salis placidi voltum fluctusqué quietos
ignorare iubes? Mene huic confidere monstro?
Aencan credam quid enim fallacibus auris
et caelo, totiens deceptus fraude sereni?'
Talia dicta dabat, clavumque affixus et haerens
nusquam amittebat, oculosque sub astra tenebat.

—*Aen.* v. 841–851.

What is the subject of the fifth book?
What is the probable origin of the above story of Palinurus?
Write out the last two verses, indicating feet, quantities, and cæsuras, and give the rules for all the quantities.

Cicero.

Translate:

Municipiis dispertiri iubet. Habere videtur ista res iniquitatem, si imperare velis, difficultatem, si rogare. Decernatur tamen, si placet. 8. Ego enim suscipiam et, ut spero, reperiam, qui id, quod salutis omnium causa statueritis, non putet esse suae dignitatis recusare. Adiungit gravem poenam municipiis, si quis eorum vincula ruperit; horribiles custodias circumdat et digna scelere hominum perditorum sancit, ne quis eorum poenam, quos condemnat, aut per senatum aut per populum levare possit.

—*Cat.* IV, 4, 7–8.

Whose opinion is here stated? What was the opposing opinion, and by whom was it proposed?

Composition.

Translate into Latin the passage following the brackets:

[The Pompeians regarded this as completely deciding the contest. The noble Romans threw off their reserve; some advised Pompey to reënter Italy, others to reconquer Spain. The vast retinue of consulars, senators and generals were a great hindrance to any energetic and active operations.] Some accused Pompey of not wishing to conquer, and Domitius asked how long Agamemnon, the king of kings, intended the war to last. The most insolent was Labienus, Caesar's old lieutenant, the only one who had deserted him. He swore that he would conquer his old general. The prisoners taken at Dyrrachium he ordered to be put to death. "We will have no peace," said he, "until you bring us Caesar's head." The noble senators were so sure of victory that they began to dispute about the consulates and praetorships.

—*Leighton's History of Rome*, pp. 330–331.

V. GREEK.

Translate:

Ἕκτωρ δὲ Πριάμοιο πάϊς καὶ δῖος Ὀδυσσεὺς
χῶρον μὲν πρῶτον διεμέτρεον, αὐτὰρ ἔπειτα
κλήρους ἐν κυνέῃ χαλκήρεϊ πάλλον ἑλόντες,
ὁππότερος δὴ πρόσθεν ἀφείη χάλκεον ἔγχος.
λαοὶ δ' ἠρήσαντο, θεοῖσι δὲ χεῖρας ἀνέσχον·
ὧδε δέ τις εἴπεσκεν Ἀχαιῶν τε Τρώων τε·
Ζεῦ πάτερ, Ἴδηθεν μεδέων, κύδιστε, μέγιστε!
ὁππότερος τάδε ἔργα μετ' ἀμφοτέροισιν ἔθηκεν,
τὸν δὸς ἀποφθίμενον δῦναι δόμον Ἄϊδος εἴσω,
ἡμῖν δ' αὖ φιλότητα καὶ ὅρκια πιστὰ γενέσθαι.
Ὣς ἄρ' ἔφαν· πάλλεν δὲ μέγας κορυθαίολος Ἕκτωρ
ἂψ ὁρόων· Πάριος δὲ θοῶς ἐκ κλῆρος ὄρουσεν.
οἱ μὲν ἔπειθ' ἵζοντο κατὰ στίχας, ἧχι ἑκάστῳ
ἵπποι ἀερσίποδες καὶ ποικίλα τεύχε' ἔκειτο.
αὐτὰρ ὅγ' ἀμφ' ὤμοισιν ἐδύσατο τεύχεα καλὰ
δῖος Ἀλέξανδρος, Ἑλένης πόσις ἠϋκόμοιο.

—*Iliad*, III, 314–329.

State where *αφείη* is formed, and from what verb, and explain the mood as used here.—Give the Attic form of *ἠρήσαντο*, and the rule for it.—Explain the meaning of the form *εἴπεσκεν*.

Translate:

Μένων δὲ ὁ Θετταλὸς δῆλος ἦν ἐπιθυμῶν μὲν πλουτεῖν ἰσχυρῶς, ἐπιθυμῶν δὲ ἄρχειν, ὅπως πλείω λαμβάνοι· ἐπιθυμῶν δὲ τιμᾶσθαι, ἵνα πλείω κερδαίνοι· φίλος τ' ἐβούλετο εἶναι τοῖς μέγιστα δυναμένοις, ἵνα ἀδικῶν μὴ διδοίη δίκην. ἐπὶ δὲ τὸ κατεργάζεσθαι ὧν ἐπιθυμοίη συντομωτάτην ᾤετο ὁδὸν εἶναι διὰ τοῦ ἐπιορκεῖν τε καὶ ψεύδεσθαι καὶ ἐξαπατᾶν· τὸ δὲ ἁπλοῦν καὶ τὸ ἀληθὲς ἐνόμιζε τὸ αὐτὸ τῷ ἠλιθίῳ εἶναι στέργων δὲ φανερὸς μὲν ἦν οὐδένα, ὅτῳ δὲ φαίη φίλος εἶναι, τούτῳ ἔνδηλος ἐγίγνετο ἐπιβουλεύων. καὶ πολεμίου μὲν οὐδενὸς κατεγέλα, τῶν δὲ συνόντων πάντων ὡς καταγελῶν ἀεὶ διελέγετο.

—*Anabasis*, II, IV, 21–23.

Λαμβανοι, why the optative? Show how this tense is formed from the verb-stem. Show the same of *διδοίη*. Give the derivation of *συντομωτάτην*. Rule for the case of *τῷ ἠλιθίῳ?* Where is *κατεγέλα* formed, and from what verb? Inflect this form.

Translate (at sight):

Καὶ γὰρ ἐν ταῖς μάχαις πολλάκις δῆλον γίγνεται ὅτι τό γε ἀποθανεῖν ἄν τις ἐκφύγοι καὶ ὅπλα ἀφεὶς, καὶ ἐφ' ἱκετείαν τραπόμενος τῶν διωκόντων· καὶ ἄλλαι μηχαναὶ πολλαί εἰσιν ἐν ἑκάστοις τοῖς κινδύνοις ὥστε διαφεύγειν θάνατον, ἐάν τις τολμᾷ πᾶν ποιεῖν καὶ λέγειν.

Translate into Greek:

I love not those who are plainly willing to lie and deceive in order to have riches, nor should I wish to become the friend of one who dared to do or say anything and everything for the sake of escaping death.

SIXTEENTH ANNUAL COMMENCEMENT.

June 19, 1884.

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2. *In Civil Engineering*—Design, Specifications and Analysis of a Howe Truss-Bridge, CLARK WALDO McCREA, B.C.E.
3. *In Ancient Classical Literature*—Thucydides' Influence on Demosthenes, MARY MERRILL PITCHER, A.B.
4. *In Ancient Classical Literature*—The Political Opinions of Isocrates, JOHN CAREW ROLFE, A.B., (Harvard).

III. PRIZES AWARDED.

The Woodford Prize in Oratory.

To Charles Anson Potter.

The Horace K. White Prizes in Veterinary Science.

The first to . . . . Fred. Martin Chappell
The second to . . . . William Augustus Lockwood.

IV. HONORS.

Honors for General Excellence.

Miss Emma Neal Bassett,
Miss Ida Cornell,
Miss Harriet Elizabeth Grotecloss,
Ernest Wilson Huffcut,
James McLoughlin,
Elmon Monroe,
Everett Fleet Morse,
Miss Helen Mar Oakes,
Henry Jay Patten,
Ernest Emory Russell,
Ira Alexander Shaler,
Harry Laurence Shively,
Charles Monroe Thorp,
Yorinaka Tsumaki,
Lewis Henry Tuthill,
John Waring,
Walter Loring Webb,
Oscar Dillwyn Weed,
Charles Bundy Wilson.

Special Final Honors.

William Christopher Krauss, *Insect Anatomy.*
Harry Laurence Shively, *German.*
Andrew Curtis White, A.B., (Hamilton) *Latin* and *Greek.*

Special Mid-Course Honors.

Henry Charles Charpiot, *French.*
Harry Falkenau, *French and German.*
Rollin Arthur Harris, *Mathematics.*

V. DEGREES CONFERRED.

Bachelors of Arts.

Lapham, Ludlow Eliakim,
Lewis, George Washington,
Monroe, Elmon,
Sibley, Herbert Delano,
Tuthill, Lewis Henry,
Weed, Oscar Dillwyn,
Williams, Timothy Shaler,
Wilson, Charles Bundy.

Bachelors of Philosophy.

In the Course in Philosophy.

Bassett, Emma Neal,
Decker, Delbert Harvey,
Thorp, Charles Monroe.

In the Course in History and Political Science.

Ayres, Philip Wheelock,
Case, Howard Emmet,
Patten, Henry Jay,
Randolph, Cyrus,
Russell, Ernest Emory,
Stambaugh, John Tod.

Bachelors of Science.

In Science and Letters.

Bering, Wilson Morrison,
Burrows, James Bering
Cassedy, William Fraser,
Chisholm, Charles Fillmore,
Coles, Franklin Albert,
Collmann, Onnie Janssen,
Cornell, Ida,
Cowles, Lewis Hutchinson,
Davidson, George Bruce,
De Forest, Harry Pelouze,
Dietz, John Fanning,
Ditmars, George Ford,
Fish, Fred Starr,
Gambee, Linnie,
Grotecloss, John Hamilton,
Hittinger, Mathias,
Huffcut, Ernest Wilson,
Jones, Charles Sumner,
Krauss, William Christopher,
Maguire, Edward,
McLoughlin, James,
Oakes, Helen Mar,
Potter, Charles Anson,
Shively, Harry Laurence,
Story, Elmer Gildersleeve,
Von Ostrand, Byron Dean,
Walch, Charles John.

In Science.

Kerr, Milton Royce,
Spurr, Marcia Edith.

In Chemistry and Physics.

Robinson, Charles Isaac.

In Natural History.

Grotecloss, Harriet Elizabeth.

Bachelors of Agriculture.

Boshart, Charles Fred,
Welles, Nelson Ackley.

Bachelors of Architecture.

Tsumaki, Yorinaka.

Bachelors of Civil Engineering.

Carpenter, Fred Wisner,
Hasbrouck, Charles Alfred,
Larned, William Henry,
Mead, Daniel Webster,
Murphy, Edward Charles,
Shaler, Ira Alexander,
Webb, Walter Loring.

Bachelors of Mechanical Engineering.

Curnow, George Trevilyan,
Morse, Everett Fleet,
Waring, John.

Master of Science.

Cushing, Harry Platt, B.S.

Master of Arts.

Pitcher, Mary Merrill, A.B.,
Rolfe, John Carew, A.B. (Harvard).

Civil Engineer.

McCrea, Clark Waldo, B.C.E.

Licentiate Certificate.

Mechanical Drafting and Shop Work.

Wyckoff, James Newton.

Medical Preparatory.

Krauss, William Christopher, B.S.

Military Science.

Cassedy, William Fraser, B.S.,
Decker, Delbert Harvey, Ph.B.,
Jones, Charles Sumner, B.S.,
Shaler, Ira Alexander, B.C.E.,
Weed, Oscar Dillwyn, A.B.

ASSOCIATE ALUMNI.

By the Charter of the University the graduates, after they shall amount to one hundred in number, are entitled to elect one of the Board of Trustees each year. At a meeting called for the purpose, and held on Wednesday, June 26th, 1872, the day preceding the annual commencement, representatives of all the classes that had graduated being present, the following organization was effected.

ARTICLES OF ASSOCIATION ADOPTED JUNE 26, 1872.

AMENDED JUNE, 1873.

I. The Alumni of Cornell University hereby constitute themselves an association to be known by the name of the Associate Alumni of Cornell University.

II. The object of this association is declared to be to promote in every proper way the interest of the University, and to foster among the graduates a sentiment of regard for each other, and attachment to their Alma Mater.

III. All graduates of this University who, by their diplomas, are entitled electors of the University, are members of this association. All members of the Faculty of this University are honorary members of this association.

IV. The officers of this association shall consist of a president, and one vice-president from each graduating class, a corresponding secretary, a recording secretary and treasurer.

V. This association shall meet annually on the day preceding Commencement, at ten o'clock in the forenoon.

VI. Any proposition to alter or amend these articles of association must be made at a regular meeting and have the assent of two-thirds of the members present.

Officers for 1884–85.

President—G. R. Van De Water, '74.
Corresponding Secretary—C. H. Esty, '76.
Recording Secretary—G. W. Harris, '73.
Treasurer—H. M. Hibbard, '74.
Executive Committee—C. H. Esty, G. W. Harris, H. M. Hibbard, *ex officio;* S. D. Halliday, '70; M. Van Cleef, '74.
Trustee elected, 1884—J. B. Foraker, '69.

By amendment to the Charter of the University, passed May 15, 1883, permitting the members of the Alumni not personally present to vote at the Annual Election of Trustees, the Treasurer is required to keep "a registry of the signature and address of each alumnus." It is therefore important that each alumnus send to the Treasurer, immediately, his present full address (in cities giving street and number), and hereafter give notice of any change in such address.

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Recording Secretary—H. L. Fairchild, 102 East 52d street.
Corresponding Secretary—J. D. Messner, 60 Cedar street.
Treasurer—C. H. Wilmarth.
Executive Committee—Eugene Frayer, *chairman;* A. Buchman, S. P. Sturges, D. J. Tompkins, W. E. Lucas, J. Frankenheimer, L. L. Seaman, R. S. Kent, and C. Tomkins, *ex officio.*

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Secretary—F. P. Rundell, Minneapolis.

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WASHINGTON, D. C., ASSOCIATION.

President—D. E. Salmon.

Secretary and Treasurer—Percy E. Clarke.

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CORNELL UNIVERSITY.

SPECIAL NOTICE.

COURSE IN ELECTRICAL ENGINEERING.

The rapid development of the applications of electricity has created a demand for thoroughly trained engineers conversant with electrical science, especially by companies carrying on telegraphy, electrical lighting, electrical supply and transmission of power, electroplating, the manufacture of electrical machinery and apparatus, etc. Recognizing .this demand, at the beginning of the next academic year (Sept. 18, 1883), the trustees of Cornell University will receive students who desire to fit themselves to enter this new and constantly extending field. While the general studies are mainly those of the departments of Civil and Mechanical Engineering, the special studies of the course embrace the theory of electricity, the construction and testing of telegraph lines, cables, and instruments, and of dynamo machines, and the methods of electrical measurement, electrical lighting, and the electrical transmission of power.

The completion of the new chemical and physical laboratories of the University, and the large recent purchases of electrical apparatus from the best makers in England, Germany, France, and the United States, enable the University to present every facility for the pursuit of these studies.

The requirements for admission to this course are the same as for admission to the courses in Science, Science and Letters, Mathematics, Chemistry and Physics, and Analytical Chemistry, as stated on pages 27 and 29 of the University Register.

The details of this course may be had upon application to

ANDREW D. WHITE,
President.